Asymmetric information, Disclosure, and Liquidity: The Swiss Evidence.

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Introduction

Introduction

This dissertation is composed of three integrated essays. The first two investigate the impact on the firm's cost of capital and on the firm's trading liquidity from a reduction in the asymmetric information levels, while the last one focuses on how the presence of asymmetric information amongst investors influences trading liquidity trends before scheduled announcements. The common factor of the three research works is the analysis of the impact and of the consequence that the presence of the asymmetric information amongst market agents has on some firm's variables.

Asymmetric information is present among agents when the level of information is different amongst parts, or when one part has relevant information whereas the other does not. The presence of asymmetric information generates different agents' behaviours, which determine the problems of adverse selection and moral hazard. The adverse selection is a typical problem that occurs before a trade is made, and it arises from the inability of the buyers to differentiate the quality of products that they are going to buy. In the equity market, such adverse selection is present when investors are going to invest in securities. If they are unable to observe the quality of the securities, due to lack of information and, hence, less transparency, they will avoid the investment or ask for a higher risk premium[1]. This behaviour has important consequences, especially on the firm's cost of capital and on the firm's trading liquidity.

The aim of this dissertation is to analyze these consequences, knowledge of which can be used to improve decision processes. Specifically, the object was to try to understand if a reduction of asymmetric information between firms and their shareholders may encourage a reduction in the firm's cost of capital, and also to find the consequences on the firm's daily trading volume. Finally, attention was centred on the investors' behaviour, and what the existence of asymmetric information generates close to a firm's disclosure.

Common characteristics of the three research works are both the empirical analysis approach, which is made with different methodologies, and the use of samples of Swiss firms listed at the Swiss Stock Exchange.

[1] See, for example, Barry and Brown (1984, 1985)

The presence of information asymmetries usually increases the phenomena of adverse selection between askers and bidders of a firm's securities. A typical consequence is a reduction in the trading liquidity[2] that arises from the reluctance of investors to hold securities. To prevail over this, firms must offer securities at discounted prices with a consequential increase of cost of capital. To avoid this, a theoretical method could be a reduction in the existence of information asymmetries, made by increasing the level of disclosure between firms and their stakeholders. In fact, as in Levitt (1998), an increase in levels of disclosure should increase the investor's confidence to ask for securities, reducing the possibility of information asymmetries and most likely increasing the levels of liquidity. This should reduce the discount at which securities are sold, and hence lower the costs of firms' capital[3].

One way to increases the level of disclosure, as the Ashbaugh's (2001) analysis[4] suggests, could be the adoption of an international accounting standards IAS[5] or U.S. GAAP[6]. In the analysis made, it is assumed that the choice between IAS and US GAAP is inconsequential. In fact, literature reports evidence[7] that the difference between the two accounting standards has a negligible effect on some variables that are used in this analysis.

The choice to adopt an international accounting standard for Swiss firms can be considered as a real necessity to improve not only the disclosures to shareholders, but also their quality, as shown in Daske and Gebhardt (2006). In fact, disclosure requirements in Switzerland are regulated by the Code of Obligations, which was instituted in 1936. It establishes the Swiss generally accepted commercial principles (GACP), on which many revisions have been made, up until the last revision of the Code of Obligations in 1992. Prior to this revision, the only requirement for listed companies was to

[2] See for example Copeland and Galai (1983), Kyle (1985) and Glosten and Milgrom (1985).
[3] As reported in Diamond and Verrecchia (1991) and in Baiman and Verrecchia 1996)
[4] Ashbaugh's (2001) analysis suggests that firms adopt IAS to improve disclosures to shareholders.
[5] International Accounting Standards (IAS) was named International Financial Reporting Standards (IFRS) in summer 2002.
[6] United States Generally Accepted Accounting Principles.
[7] Leuz (2003) analyzing German firms, reports evidence that differences in the bid-ask spread and share turnover between IAS and U.S. GAAP firms are statistically insignificant and economically small. Thus, the choice between IAS and U.S. GAAP appears to be of little consequence for information asymmetry and market liquidity. Harris (1995) provides evidence that accounting measures under IAS can produce results similar to U.S. GAAP.

provide an annual balance sheet and a profit and loss account. In 1984 a standardization body was created, the Swiss foundation for financial reporting standard, which issues the Swiss Accounting and Reporting Recommendations (Swiss GAAP ARR or Swiss GAAP FER[8]). But, as reported in Murphy (1999), although Swiss companies have a set of national standards, these standards can be criticized for their lack of disclosure and for the use of special reserves. The adoption of an international accounting standard for Swiss firms can eliminate the lack in disclosures and reassure investors that they do not use special reserves with consequential benefits in terms of firms' cost of capital.

The aim of the first essay is to investigate if there is a well defined relationship between the voluntary choosing of an international accounting standard and a reduction in the firm's cost of capital for Swiss listed companies. To achieve this goal, I have used three proxies for measuring the impact on the cost of capital: the bid-ask spread, the volume turnover and the return's volatility. The choice of these proxies is motivated by the fact that they are often used in similar literature[9] and indicated as appropriate tools to measure the asymmetric component of the firm's cost of capital. The reduction of bid-ask spreads positively affects the firm's cost of capital. In fact, greater transparency on the firm's situation can reduce the adverse selection behaviour of the investors, generating costs savings related to need to provide incentives for the demand of less transparent securities. The increase of the trading liquidity can suggest a reduction of the firm's cost of capital because it is associable either with a decrease of the cost of transaction, which is related to a lower level of transparency which implies more risk, and therefore greater cost in order to compensate a higher risk premium[10], or to an increase in the demand of shares, due to the willingness of the investors to exchange those more transparent[11]. The reduction of the return's volatility can suggest a reduction of the firm's cost of capital following the choice of disclosing more information, be-

[8]FER, "Fachempfehlungen der Rechnungslegung", is the German indications of ARR, Accounting and Reporting Recommendations

[9]See, for example, Bartov and Bodonar (1996), Callahan, Lee and Yohn (1997), and Leuz and Verrecchia (2000).

[10] Barry and Brown (1984, 1985) argue that in the presence of imperfect information investors have greater probabilities of risk in estimating the futures payoff of their investments.

[11] Diamond and Verecchia (1991) argue that the publication of information apt to reduce the information asymmetry can reduce the cost of capital through the increase in the demand of securities that are more transparent

cause an increase of the level of information contributes to reducing the probability of an investment's loss for investors, who will be stimulated to reduce the frequency of going in and going out from a firm's share investment. Moreover, an increase of the transparency also contributes to reducing the probability of unexpected events that could be reflected in a less volatile share price, as suggested by Lang and Lundholm (1993).

Following this argumentation, I have proposed and tested the hypotheses that an adoption of an international accounting standard determines a decrease in the bid ask spread, an increase in the trading liquidity level and a significant impact on the return volatility.

Regressions are made with OLS technique, considering the problems of presence both of heteroskedasticity between residuals and of self selection of the variable indicating the adoption of the accounting method. In fact, the choice to adopt an international accounting standard is not a random event, but the result of a precise management choice. The methodology proposed by Heckman (1979), in which residuals are corrected with a term called "Inverse of Mill's ratio" will be used as control for this self selection problem. Using this methodology, the explanatory power of the proposed models increases, broadening the significance of the relationship. To solve the heteroskedasticity problem, I have made a transformation of the proposed models. A common technique used today is to do regression estimations that are heteroskedasticity-consistent. I have employed this technique in the subsequent essays.

The analysis results show the existence of a significant relationship between the adoption of an international accounting strategy and the two variables of bid-ask spread and volatility of return, and the insignificance of the relationship with the trading liquidity. These results are also confirmed both by robustness checks and by a simultaneous approach. The analysis shows evidence of a negative relationship between the adoption of an international accounting standard and the bid-ask spreads and of a positive relationship between the adoption of an international accounting standard and the return's volatility. This evidence is therefore in line only with the first and the last hypotheses. The explanation of the insignificant relationship between the adoption of an

international accounting standard and the trading liquidity comes out from the analysis made in the second essay.

The goal of the second essay was to investigate if there is a definite relationship between the adoption of an international accounting standard and the increase in the trading liquidity for Swiss listed firms. This goal emerges from the limited[12] literature on the Swiss evidence, and, especially, because in the first essay a significant relationship between the adoption of an international accounting strategy and the increase in firm's trading liquidity was not found. In fact, following both the theoretical prediction[13] and the empirical evidence of other studies[14], the relationship between the decrease in asymmetric information and increase in trading liquidity should be positive. Therefore, it was my purpose to do the analysis with a different approach[15].

According to economic theory, a reduction of the information asymmetry is reflected positively on the trading activity for a listed company. Adopting an international accounting standard, and by doing so deciding to increase the quantitative level of disclosure[16], leads to a higher transparency on the firm's economic and financial situation. An increase of the firm's transparency is followed by an increase in the investors' confidence[17] to ask shares in the firm, therefore increasing the trading volumes. Moreover, the increase in trading activity should be relatively higher for small firms, considering that these start from a higher level of asymmetric information due to the limitation of their numbers and sources of information[18]. It follows that the standardization of the level of disclosure through the adoption of an international accounting standard should have more effect on the firms with higher information asymmetries, hence with the small firms.

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[12] Daske, Hail, Leuz, and Verdi (2007) find increase in market liquidity and cost of capital benefits for European firms, Switzerland included, that switch to IFRS before this reporting became mandatory.
[13] See, for example, Glosten and Milgron (1985) and Karpoff (1986).
[14] See, for example, Leuz and Verecchia (2000).
[15] In the second essay, I use a panel data approach to complete the cross analysis of the first essay. Due to incomplete data availability, the analysis' sample decreases to 64 firms from 159.
[16] The International Accounting Standards (IASs) are developed by the International Accounting Standards Committee (IASC), the goal of which is to improve the quality of the financial statements and the degree of comparability amongst firms' release. (International Accounting Standards Committee, 1995, 33)
[17] Mainly for informed investors.
[18] The tendency of the media is to report more news on large firms.

Following this argumentation, I have proposed and tested the hypotheses that firms that adopt an international accounting standard show an increase in trading liquidity, and that the magnitude of the increase is relatively higher for the small firms.

Time series statistical tests, time series regressions and cross sectional analysis confirm the hypothesis, showing evidence of an increase in trading liquidity after the adoption of an international accounting standard, and also that the magnitude of the increase is higher for the small firms. It is interesting to note the evidence that emerges from the analysis conducted in this essay helps to explain the insignificant result in the first essay. During the adoption of an international accounting standard, on average, firms also increase the total number of outstanding shares. This operation has a non negligible effect on the trading liquidity when it is proxied by the volume turnover. In fact, the volume turnover, which is defined as the ratio between the number of shares traded and the total number of shares outstanding, is influenced by a denominator effect, which determines an artificial reduction of the relative trading liquidity. Controlling the analysis for this effect, results are in line with the hypothesis.

A goal for future research is to review the first essay, including this evidence. Perhaps, controlling the regression for this artificial effect, I will obtain results in line with the proposed hypothesis.

The last essay differs from the first two, in that it is focused on the analysis of asymmetric information amongst investors, instead of asymmetric information between firms and their investors. Specifically, the analysis is focused on the impact from the presence of asymmetric information on the trading liquidity trend before earnings announcements. In fact, while the literature on the analysis of the volume turnover around and after earnings announcements is abundant, it is very limited on the analysis of the volume turnover before earnings announcements, and to my knowledge is completely lacking in the Swiss evidence.

In general, trading volumes are positively related to asymmetric information, but when there is time discretion, the relation is likely to become negative, as show in Admati and Pleiderer (1988) and in Foster and Viswanathan (1990). The aim of this analysis is to empirically verify the existence of this inverse relationship for a sample of Swiss listed firms. To achieve this purpose, I have analyzed trading volume trends be-

fore scheduled earnings announcements. In fact, before such events, asymmetric information between informed and uninformed investors is higher[19], and the adverse selection problem of the uninformed investors increases, as argued by Wang (1994). In this situation, rational uninformed investors, to protect themselves from adverse selection risk, tend to either postpone their investment until after the announcement when the adverse selection problem is resolved, or demand a higher discount price in order to cover the risk of trading against informed investors. These behaviours should have both a negative impact on trading volume before earnings announcements and a positive impact on the relationship between trading volume and contemporaneous price change. In fact, if an uninformed trader is time discretionary, they can decide to postpone their investments until the adverse selection problem is less severe or resolved. By doing so, the trading liquidity before an earnings announcement should decrease. According to this behaviour, it is likely that uninformed investors will trade less before scheduled announcements to avoid being overwhelmed by investors with more precise private information. On the other hand, if uninformed investors are not time discretionary and cannot avoid trading, they will protect themselves by asking for a premium for trading against pre-disclosure private information. In response, stocks' price change should be positively related to trading liquidity before a scheduled earnings announcement. Moreover, informed investors, using their pre-disclosure private information, try to anticipate the announcement rebalancing their portfolio before news is released. In case they expect positive surprises from the earnings announcement, they can be motivated to ask for stocks even at higher price levels to take position. In contrary, they can also be motivated to not take position or to close their position if they already hold one. It follows that in case of positive earnings surprises, ex-ante firms' price levels should increase more than in case of non positive earnings surprises.

Following this argumentation, I have proposed the hypotheses that before a scheduled earnings announcement there is a decrease in the firm's trading liquidity, that the magnitude of the decrease should be positively related to the simultaneous price change, and that the magnitude of the decrease should be lower in case of positive an-

[19] Informed investors increase their process of acquisition and elaborate private information in proximity of an earnings announcement, increasing the asymmetric information with uninformed investors.

nouncements surprises. Moreover, the cause of these relationships is the presence of asymmetric information amongst investors. Therefore, evidence for this phenomenon is explored in the last part of the analysis.

To test the proposed hypotheses, I have used three approaches: the event study of the abnormal volume turnover before, around and after the scheduled announcements; the pooled time series analysis of the abnormal volume turnover around the announcements; and the pooled time series analysis of the cumulative abnormal volume turnover before the events.

Event analysis confirms a significant daily average decrease of about 2% in the abnormal volume turnover from 10 to 3 trading days before the announcement; that means a cumulative decrease of about 17%. Regressive analysis confirms the second and third hypothesis, suggesting that before earnings announcements there is a decrease in firm's trading liquidity, which is positively related to the simultaneous price change and whose magnitude is higher in case of positive earnings release.

In the last part, an analysis is made with the aim to verify whether a necessary condition of the decrease in trading liquidity before a scheduled announcement is the presence of asymmetric information. I have proxied the asymmetric information by the firm size and the bid-ask spread, which are indicated in literature as reasonable proxy for the asymmetric information[20].

Regression results do not show evidence of any connection between the cumulative abnormal volume turnover and the level of asymmetric information, in contrast to Chae's (2005) results. A possible motivation could be the open order book characteristic of the exchange market. In fact, in an open order book exchange market information asymmetries amongst investors are lower than in a specialist market, if for no other reason than lower inventory risk and higher transparency[21].

This thesis research can be divided into two integrated parts. The first part can be viewed as an analysis of the relationship between reduction in asymmetric informa-

[20] Amongst researchers that report evidence on the firm size there are also Atiase (1985), Freeman (1987) Bamber (1987), Merton (1987) and Lev and Penman (1990). Amongst researchers that report evidence on the bid-ask spread there are also Glosten and Milgrom (1985), Lee, Mucklow and Ready (1993), Greenstein and Sami (1994), and Welker (1995).

[21] In an open order book market investors have access to the order book and can infer their competitor's information.

tion amongst firms and their shareholders and decreases in firms' cost of capital, while the second part can be viewed as an analysis of the effect on trading liquidity prior to earnings announcements from the presence of asymmetric information amongst investors. Results can also been summarized in two correspondence groups. The first one reports significant evidence that listed firms that adopt an international accounting strategy benefit from a reduction in the cost of capital as a consequence of a reduction in the asymmetric information level amongst firms and shareholders, and that the magnitude of the decrease is higher for greater levels of asymmetric information. The second one reports evidence of a significant decrease in trading liquidity prior to earnings announcements, however, in contrast with the theoretical prediction, does not show evidence that this decrease is due do the existence of asymmetric information amongst investors.

The first part of this research contributes to the research field that analyzes the consequences of increases in disclosures following the Leuz and Verecchia (2000) study on the German firms. The question that can be spontaneously asked is, considering the apparent savings that derive in terms of cost of capital, why haven't all of the Swiss firms adopted an international accounting standard. Possibly because such adoption involves a series of added costs that are not always less than the benefits derived; however, this question is beyond the scope of the current research[22]. The answer must be found using a method of research which would identify specific factors of costs and benefits deriving from the adoption of an international accounting strategy. Furthermore, the adoption of an international accounting standard has recently become mandatory for the EU member countries and several analyses have not reported evidence of a decrease of the firm's cost of capital. For example, Daske (2006), using a large set of German firms, does not find supporting empirical evidence for a decrease in the cost of equity capital for firms that adopt an IAS, rather his result would suggest an increase of the cost of equity capital during the transition period. Moreover, Daske, Hail, Leuz, and Verdi (2007), using a sample of European countries, Switzerland included, find a mixed effect on the cost of capital from the mandatory adoption.

[22] As highlighted by Joos (2000) relatively to the Leuz and Verecchia (2000) analysis.

The second part of this research contributes to the limited research field opened by Chae (2005) with his evidence on the U.S. firms. In fact, while literature on trading liquidity around and after scheduled announcements is abundant, the literature on trading liquidity prior to scheduled announcements is very limited and, to my knowledge, is completely lacking in the Swiss evidence. The major contributions are those that reveal evidence on firms listed in a stock-exchange market with a limited order book, following on Chae's (2005) suggestion for future research. Evidence of this analysis is similar to the evidence reported by Chae (2005), (cumulative average abnormal log trading volume of 17% against over 15%, respectively), however, unlike Chae's research, this analysis does not reveal significant evidence of a relationship between a decrease in trading liquidity and asymmetric information amongst investors. This could be attributed to the different characteristics of the exchange market: a specialist[23] market in the U.S. case and an auction market with open and limited order book[24] in the Swiss case.

Reading the three essays it is evident how my knowledge regarding empirical research methods has increased over time. Moreover in each essay some problems have emerged, which I have tried to solve. In the first essay, the self selection problem is important. The methodology proposed by Heckman (1979), in which residuals are corrected with a term called "Inverse of Mill's ratio", was used as control for this self selection problem. In the second essay, because of scarcity of observations and presence of firm effects, the panel data regression is used. Finally, in the last essay, in testing the relation between trading liquidity and asymmetric information, I have used a panel data regression and, considering the presence of both firms and time effects, and that the time effect is not constant during years[25], I have controlled the regression both by firm and by time effect, as suggested in Petersen (2006).

[23] Specialist is referred to a specialist agents like market makers

[24] An open and limited order book exchange market is characterized by lower asymmetric information amongst investor, at least due to the possibility to read the order book and, hence, to infer competitor's information.

[25] The OLS White heteroskedasticity consistent regression reports decreasing significance estimation relative to the year dummies across years.

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Chapter 1

Relationship between Cost of Capital and International Accounting Standard for Swiss companies.

1.1 Abstract

The relationship between disclosure and a firm's cost of capital is an important topic in contemporary accounting theory. Theoretical prediction suggests that greater disclosure should lower the firm's cost of capital through the reduction of information asymmetries. In this paper I empirically analyze the impact on variables such as bid-ask spread, trading liquidity and return volatility from the adoption of an international accounting standard that is indicated as a choice to increase disclosure to shareholders. The three variables are used as proxy for the asymmetric component of the firm's cost of capital. The hypotheses made are that the adoption of an international accounting standard determines a decrease in the bid-ask spread, an increase in the trading liquidity and a significant impact on the return volatility, respectively. For a cross sectional sample of 159 Swiss listed companies, I find a negative and significant association with the bid-ask spread, a positive and significant association with the return volatility and an insignificant association with the trading liquidity from the adoption of an international accounting strategy. The magnitude is such that the firm that adopts an IAS enjoys of an average reduction of more than 45% in the bid-ask spread. This finding persists even after controlling for omitted variables and for simultaneous effect. The findings on trading liquidity are inconsistent with the hypothesis probably because the effect coming from an IAS adoption is hidden from the higher effect coming from the state of economic cycle.

JEL classification: G14, G19
Keywords: Information asymmetry, Accounting standards, Cost of capital.

1.2 Introduction

Contemporary accounting theory is focused on the relation between disclosure and the costs of firms' capital using the concept that greater disclosure should lower the costs of firms' capital that come up from information asymmetries.

The existence of information asymmetries usually increases the phenomena of adverse selection between askers and offers of a firm's securities. A typical consequence is the reduction in levels of liquidity[26] that arises from the reluctance of investors to hold securities. To prevail over this, firms must offer securities at discounted prices with a consequential increase of cost of capital. To avoid that, a theoretical approach could be a reduction in the existence of information asymmetries, increasing the level of disclosure between firms and its stakeholders. In fact, as in Levitt (1998), an increase in levels of disclosure should increase the investor's confidence to ask for securities, reducing the possibility of information asymmetries, which then ought to increase the levels of liquidity. This should reduce the discount at which securities are sold, and hence lower the costs of capital[27]. One way[28] to increase the level of disclosure could be the adoption of the international accounting standard IAS or US GAAP[29]. In this work I want to investigate if there is one well defined relation between the choice of an international accounting standard and a reduction in a firm's cost of capital for Swiss listed companies. The choice of a Swiss sample is to verify whether the results found by Leuz and Verecchia (2000) are also evident for the Swiss case. Switzerland can be of particular interest because financial disclosure has been largely discretionary in this country. In fact, although Swiss companies have a set of national standards, these standards are criticized for their lack of disclosure and for use of special re-

[26] See for example Copeland and Galai (1983), Kyle (1985) and Glosten and Milgrom (1985).
[27] As reported in Diamond and Verrecchia (1991) and in Baiman and Verrecchia (1996).
[28] Ashbaugh (2001) evidence suggests that firms adopt IAS to improve disclosures to shareholders. Moreover, several studies have shown that accounting quality is determined primarily by market forces and institutional factors, rather than accounting standards (e.g., Ball et al., 2000; Leuz et al., 2003).
[29] Leuz (2003), analyzing German firms, reports evidence that differences in the bid-ask spread and share turnover between IAS and U.S. GAAP firms are statistically insignificant and economically small. Thus, the choice between IAS and U.S. GAAP appears to be of little consequence for information asymmetry and market liquidity. Harris (1995) provides evidence that accounting measures under IAS can produce results similar to U.S. GAAP.

serves. Hence, the adoption of an international accounting standard for Swiss firms can eliminate the lack in disclosures and reassure investors that they do not use special reserves, with a consequential increase in the transparency.

For such an objective I followed the approach proposed by Leuz and Verecchia (2000). The choice to increase the disclosure level is obtained with the adoption of an international accounting standard. The reduction of the cost of capital that it derives is observable in an indirect way through the variation of its asymmetric component, which is measurable with the reduction of the bid-ask spread, with the increment of trading activity and with the variation of the return's volatility level. The approach used is the cross-sectional analysis through the estimation of three models that relate the three proxies to the adoption of an international accounting strategy. The estimation is made with OLS technique imposing the correction of the residuals of the models considering the non-casual nature of the managements' decisions to adopt an international accounting standard. The relationship between the adoption of an international accounting standard and the two variables of bid-ask spread and return volatility is statistically meaningful. On average the sample companies that adopt an international accounting standard show an inferior bid-ask spread of 45%[30] and a significant increase in the return volatility; therefore in line with theoretical predictions and previous empirical evidences. The relationship with the trading liquidity turns out to be insignificant.

The remainder of the paper is organized as follows. Section two reviews prior research on the topic. Motivations, hypotheses and research design are presented in section three. Section four provides sample selections and descriptive statistics and section five describes the models used. Section six presents empirical results and section seven reports additional reports of robustness checks. The final section is devoted to conclusions and suggestions for future research.

[30] The reduction is calculated using the antilog of the estimated coefficient reported in table 7 column II: antilog (-0.5886) - 1 = $e^{(-0.5886)}$ -1= 0.55-1=0.45

1.3 Review of the literature

The presence of the *lemons*[31] *problem* in financial markets creates the incentive for managers of companies to resort to voluntary disclosure of greater information with the goal to reduce the cost of capital. Barry and Brown (1984, 1985) argue that in the presence of imperfect information, investors have greater probabilities of risk in estimating the future payoffs of their investments. If such risk is not diversifiable in other ways, then the investment will be undertaken only against a greater risk premium, which means firms have to offer discounted securities while increasing the cost of collection of financing capital. It follows, therefore, that in order to save this cost it is necessary to reduce the information asymmetry with the disclosure of greater information. Diamond and Verecchia (1991) argue that the publication of information apt to reduce the information asymmetry can reduce the cost of capital through the increase in the demand of securities that are more transparent, thereby favouring an increase in the trading turnover.

From an empirical point of view, several studies have tried to verify this theoretical prediction. Some have analyzed the relation between the level of information and the asymmetric component of the cost of capital, others have concentrated their attention directly on the cost of capital, and others have observed the relation between information's level and some firms' characteristics.

Generally, the results are in line with theoretical predictions even if they show limits compatible with difficulties related to the use of correct tools for measuring the cost of capital. Empirical problems arise because of biases, which depend either on the presence of self selection or on omitted variables. Moreover, the presence of an already rich information environment, especially in the U.S., could hide the evidence (Verecchia 2001) [32].

[31] The lemons problem (Akerlof, 1970) is given by the existence of different level of information between parties, especially between investors and managers. There are many possible solutions, among them that of giving more information to reduce the difference between parties (Diamond and Verecchia, 1991 and Kim and Verecchia, 1994).

[32] Recent studies, for example Zhou (2004), in information environments less rich of information as the emerging markets, show results more significant in favor of the theoretical argumentations.

Among those that belong to the first research area, there are Leuz and Verecchia (2000), Welker (1995), Greenstein and Sami (1994), and Glosten and Milgron (1985). Leuz and Verecchia (2000) have analyzed for German companies the impact on the cost of capital from the commitment to give more information, measuring the asymmetric component of the cost of capital through the measure of the bid-ask spread, of the trading liquidity, and of the price return volatility. The commitment to give more information is proxied by the decision to adopt an international accounting standard. They report evidence of an inverse association with the bid-ask spread and of a direct association with the trading liquidity from an increase in disclosures level, hence in line with theoretical prediction. They also report, contrarily to the hypothesis, that the price returns volatility is significant and positively associated with the increase in disclosure to shareholders. Welker (1995) analyzes for a sample of firms listed on the NYSE the relation between information level and market liquidity through the variation of the bid-ask spread, that it is used as proxy for the market liquidity according to the paradigm that says that a reduction of the bid-ask spread indicates an increase in the market liquidity as a consequence of a higher demand of securities that become more transparent after the increase in the information level. Results show that the bid-ask spread is higher for companies with a low information index compared to those with a higher one, therefore in line with the theoretical prediction that says that an increase in the information level reduces spreads between ask and bid prices, increasing the market liquidity. Greenstein and Sami (1994) analyze the effect of the increase in disclosure on the bid-ask spread with a time series approach. They observe that the spread decreases more rapidly for companies with an initial low information level. Glosten and Milgrom (1985) analyze the bid-ask spread as a function of the presence of imperfect information between investors. They propose models in which the market liquidity is expressed as an inverse function of the adverse selection. The results show the existence of a reduction of the informative asymmetry as a benefit of the increase in disclosure.

Amongst researchers that measure the impact on the cost of capital directly, there are Botosan (1997), Botosan and Plumlee (2002), Gietzmann and Ireland (2005), Hail (2002), Daske (2006) and Lambert et al. (2007). Botosan (1997), in a study on U.S. manufacturing companies, analyzes the association between information levels

and cost of capital through the estimation of the relationship between the firm's cost of capital and a self constructed index that measures the quantity of voluntary information added in annual reports. The results show a significant reduction of the cost of capital only for companies with a low analysts following. Botosan and Plumlee (2002) analyze the relationship between cost of capital and information level through measuring the impact on the firm's cost of capital from the variation of a self constructed index that considers the information level in the quarter and in the annual reports. Their results show contrasting associations: the cost of capital decreases with an increase of the information level in the annual reports, but increases with an increase of the level of information in more frequent disclosure like quarterly reports and voluntary disclosure. Gietzmann and Ireland (2005) analyze, as Botosan and Plumlee (2002), the relation between cost of capital and timely disclosure[33] using a different measure for the information level. They introduce a variable that indicates the typology of accounting strategy, chosen between aggressive and conservative strategies. For a sample of UK firms they find results in line with the theoretical predictions observing a significant negative association between cost of capital and timely disclosure. Furthermore, they find a positive association between cost of capital and an aggressive accounting strategy, in line with other research[34]. Hail (2002) tries to quantify the effect of a firm's voluntary disclosure policy on its implied cost of capital for a sample of Swiss firms through the analysis of the relationship between the ex-ante cost of capital and a qualitative disclosure index. His results are in line with the theory and show an inverse and significant association between the two variables. Daske (2006) investigates empirically the claim that the adoption of international accounting standard lowers the cost of equity capital for a sample of German firms in the period 1993-2002. Estimating the expected cost of equity capital directly, he finds no evidence confirming a reduction of the cost of capital. Lambert et al. (2007) examine whether and how the quality of a firm's accounting information can influence the cost of capital. Their contribution is interesting because they provide a link between information quality and firms' cost of capital without reference to market liquidity. In line with others analyses that use an indirect link through

[33] It includes information that is frequently published like the quarterly report, and other disclosures among which press conferences.
[34] For example that assumed from Gietzmann and Trombetta (2003).

either market liquidity or adverse selection, they find evidence that an increase in information quality leads to an unambiguous decline of the cost of capital.

Finally, a series of analyses on the relation between information and firms' characteristics are reported in relevant literature. Covrig et al. (2006) find evidence that the voluntarily adoption of IAS increases a firm's ability to attract foreign capital. They argue that such increase is due to an increase of the market liquidity and a decrease of the firms' cost of capital, suggesting that an important consequence of the IAS adoption is to lower the cost of capital. Francis et al. (2004) analyze the extent to which firms with favorable values of earnings attributes enjoy a lower cost of capital. They find that each earnings attribute, which are quality, persistence, predictability, smoothness, value relevance, timeliness and conservatism of the firm-specific information, is significantly associated with the cost of equity capital. Specifically, firms with the most favorable values of each attribute have significantly lower costs of equity than firms with the least favorable values. Easley and O'Hara (2004) present an asset-pricing model in which both public and private information affect asset returns, providing a linkage between a firm's information structure and its cost of capital. A significant characteristic of their model is that the information plays an important role in equilibrium, where a lesser dispersion of public information corresponds to a lower firm's cost of capital. This implication suggests that firms could lower their cost of capital by reducing the dispersion of private information, for example, disclosing more information to the market. Bartov and Bodnar (1996), show that firms can increase the market liquidity as a consequence of a reduction of the informative asymmetry through the adoption of more informative accounting methods. Heady, Hutton and Palepu (1999), show that an increase of the disclosure level is followed by an increase of the stock liquidity, of the firm's performance, of the institutional ownership and of the analysts following. Lang and Lundholm (1996, 1999) find that for firms that give more information a higher analyst following can be observed, as well as less dispersion of the analyst's forecasts, less volatility of the revision of the result's forecasts, and a positive impact on the price of new shares

issues[35]. Murphy (1999), in a study analyzing the characteristics of Swiss firms that have voluntarily decided to adopt an international accounting standard, finds that the foreign activity (analyzed by the shares listed in foreign exchange markets and by the foreign sales), in contrast to the ratio between debt and capital, has a significant impact on the decision. The insignificant evidence of the debt to capital ratio is an unexpected result. In fact, for Swiss companies the debt holders are mainly banks, which have easier access to the firm's private information in respect to other shareholders, and hence do not need to increase the disclosure. Murphy (1999) claims that the benefit from the adoption of an international accounting standard could be noticeable for firms orientated to international investors, and unnecessary for those orientated only to the domestic investors. The same conclusion is formulated in the international analysis of El-Gazzar et al. (1999), which has observed that the domicile in a UE country and a low debt to capital ratio are characteristics positively correlated with the adoption of an international accounting standard for firms that use more share capital than debt. Aurer (1998) examines the impact of the choice of an international accounting standard on some risk parameters for Swiss firms, especially for the return volatility, the volatility of the abnormal return and the beta parameter, which indicates the correlation with the market index. The results based on observations from 1988 to 1993 show that a change in the accounting standard has a significant impact, without a clear direction, on the return volatility, but doesn't have a significant impact on the cost of capital.

1.4 Motivations, Hypotheses and Research Design

Economic theory suggests the existence of a well defined relationship between asymmetric information and firms' cost of capital according to which a reduction of the information asymmetry is reflected positively on the cost of financing for a listed company. Adopting an international accounting standard, and by doing so deciding to in-

[35] In their study there is evidence that the management voluntarily increases the amount of information given to the investor in correspondence of the emission of new shares for being able to obtain a higher issue price.

crease the qualitative and quantitative level of disclosures, leads to a lower level of information asymmetry between issuers and buyers of securities. In fact, the increased transparency on the financial situation of the company permits a more accurate analysis of the economic situation of the company, decreasing the risk level which is related to an investment in shares by the company itself. Starting from this consideration, an investor who asks for shares will ask for a smaller risk premium as well. On his side, the issuer will sell his shares more easily, saving the cost to convince the investors to buy shares of the company even in the case of a lower transparency level. Less incentives and less risk premiums are involved in decreasing the cost of financing.

The demonstration of the reduction of the cost of capital for firms that adopt an international accounting strategy can be obtained in an indirect way, through the use of tools that the literature has demonstrated[36] as useful for estimating the cost of capital: the bid-ask spread, the trading liquidity and the shares return volatility[37].

The reduction of bid-ask spread, derived from the decrease of its adverse selection's component[38], positively affects the cost of capital because greater transparency on the firm situation can reduce the adverse behaviour of investors, permitting thereby a savings in the cost of providing incentives for the demand for less transparent securities. This argumentation suggests the formulation of the following hypothesis.

HYPOTHESIS 1: *The increase of the amount of information disclosed, therefore the adoption of the international accounting standard, reduces the firm's bid-ask spread because of a reduction in asymmetric information between a firm and its shareholders. It follows the existence of an inverse association between quantitative level of information and bid-ask spread.*

An increase in the trading volume can also reflect a reduction in the firm's cost of capital because it is associable either with a decrease in the cost of transaction, which is related to the idea that a higher level of transparency implies less risk and, therefore, less cost in order to compensate less risk premiums, or to an increase in the demand of

[36]See, for example, Bartov and Bodonar (1996) and Callahan, Lee and Yohn (1997).
[37] The same tools used by Leuz and Verrecchia (2000) for German firms.
[38] The bid-ask spread is composed at least of three components: order processing, adverse information and inventory holding cost. See Huang and Stoll (1997).

shares due to the willingness of investors to exchange those more transparent. This argumentation suggests the formulation of the following hypothesis.

HYPOTHESIS 2: *The increase of the amount of information disclosed, therefore the adoption of the international accounting standard, increases the firm's trading liquidity because of a reduction in asymmetric information between a firm and its shareholders. It follows the existence of a positive association between the quantitative level of information and trading volume.*

The volatility of the shares' return can also be used as an instrument for measuring the variation of the cost of capital as a consequence of an increase in disclosure to shareholders. In fact, a decrease in the asymmetric information between firm and shareholders contributes to the reduction of the probability of unexpected events, which reduces the investors' uncertainty and, hence, the frequency of portfolio rebalancing. This follows a consequential negative impact on the price fluctuations. But, empirical researches provide opposite evidence on the relation between disclosure and volatility. For instance, Lang and Lundholm (1993), contrarily to their hypotheses, find evidence of a positive relation between the level of public information and the share's return volatility. The result is confirmed by the Welker (1995) and Leuz and Verecchia (2000) analyses. Bushee and Noe (2000) try to explain this empirical evidence. They suggest that an improvement in corporate disclosure practices may attract short-sighted investors, whose aggressive trading strategies may lead to higher stock return volatility. Moreover, institutional investors, who hold a large position, a diversified portfolio and trade infrequently, tend to invest in more transparent firms, hence, in firms that release more information to shareholders. The consequence is a negative relation between high disclosure level and return volatility. So, the relationship could be mixed, and the net change in price return volatility depends on which type of investor presence dominates. This argumentation suggests the formulation of the following hypothesis.

HYPOTHESIS 3: *The increase of the amount of information disclosed, therefore the adoption of the international accounting standard, has an impact on a firm's share price volatility because of a reduction in asymmetric information between a firm and its*

shareholders. It follows the existence of an association between the quantitative level of the information and the price return volatility.

The common factor to the three hypotheses remains therefore the impact of the quantitative level of information on the existing informative asymmetry between investors; impact that has consequences on some market variables of listed firms, especially on those used as proxies in this study.

In order to test the hypotheses, cross-sectional analysis and regression of economic models has been used to try and explain the relationship between the choice of adopting an international accounting strategy and some financial characteristic of the analyzed firms. Regressions are made with OLS technique after the adaption of the economic models for resolving problems related to the presence of heteroskedasticity between residuals, and to the non-random nature of the variable indicating the adoption of an accounting method. The models used are those proposed by Leuz and Verecchia (2000), which are adapted to better describe the Swiss case.

1.5 Sample Selection and Descriptive Statistics

The sample's selection begins from the 229 Swiss firms included in SPI index during 2004. For each of them, the information on the accounting standard used is available on the WorldScope database. Among these, they show 52 firms that belong to the financial sector, which are eliminated reducing the sample to 177 non-financial firms. At least 18 of these lasts are eliminated for insufficiency of observations, reducing the final sample to 159 non-financial firms. Table 1.1 reassumes the procedure of selection process and shows the distribution of the adoption of accounting standard among the firms. Of the 159 firms, 59 adopt a local accounting standard, while 100 adopt an international one. Of these last, 90 firms follow the IFRS norms, and 10 follow the U.S. GAAP.

The statistic description of the sample is reported in table 1.2. The average size of the market value of the sample is of 3.89 billion of CHF, with the biggest firm capitalizing 152,9 billion and the smallest 3,91 million. A meaningful difference is ob-

served among the firms that adopt an international accounting standard and those that adopt a local one, with an average (median) market capitalization that varies from 5.798 billion (0,446) to 0.645 (0,166), respectively. The same trend is obtained for the trading liquidity that is measured by the median of the daily volume turnover ratio. The firms that opt for an international accounting standard show a daily turnover ratio in mean (median) of 0,16% (0,11%) against 0,08% (0,05%) of the others that adopt a local accounting standard. An inverse trend is observed for the price returns volatility and for the bid-ask spread ratio. This last shows a meaningful difference in average (in median) that varies from 4,03% (2,1%) to 1,16% (0,74%) for the firms that respectively adopt either local or international accounting standards; the volatility varies in average from 2,03% to the 1,87% while the median remains almost the same.

Therefore, in line with the expectations, the firms that adopt an international accounting standard have in average a greater market value, a greater volume, a smaller bid-ask spread and a smaller volatility. Also in line with the expectations, the financial leverage and the following of the analysts are respectively smaller and greater for the firms that adopt an international standard. Contrary to expectation, the return of the assets is in average worse for the firms that opt for the international accounting standard.
Table 1.3 contains the coefficients of the correlations amongst selected variables and indicates that those used as tools to proxy the cost of capital move themselves online with the hypotheses: the MV and the VTR increase while the BAS and the VLTY decrease to the adoption of an international accounting standard. Movements in line with theoretical and empirical evidence for the other variables, except for the proxy of the performance, the ROA, are also contrary to expectations. Moreover, it is observed that the correlations are sufficiently low among variables to exclude collinearity among them and that the maximum value of 0.541 is between the shares' return volatility and the bid-ask spread, showing the idea that the more volatile firms are those with greater bid-ask spread. The higher correlation of the variable indicating the adoption of the international accounting standard is with the variable indicating the internationalization of the firms, showing therefore that the firms listed also in foreign markets are those that mainly opt for an international accounting strategy. Consequently this is in line with Ball, Robin e Wu (2000) and with Murphy (1999), which suggests that disclosing

results only one time in a unique international standard is less costly than disclosing results more times in respectively local standards.

1.6 The model

1.6.1 Cost of Capital

For cost of capital models, I use those proposed by Leuz and Verecchia (2000) in a study done on German firms. The basic idea of this model is the indirect measure of the cost of capital through the estimation of the variation of tools like the bid-ask spread, the trading liquidity and price return volatility.
The general structure of the models is the following:

$$Cost\ of\ Capital_i = const + \beta_1 * IR_i + \sum_2^k \beta_i * X_i + \varepsilon_i \quad (1.1)$$

where IR_i is a dummy variable with a value of 1 if the *i* firm adopts an international accounting standard or 0 if the *i* firm adopts a local accounting standard, and X_i are k explanatory variables for controlling the estimations between proxy and adoption of an international accounting standard. These variables indicate some firms' characteristics that are different for different proxy used.

In the case in which the bid-ask spread is used as proxy for the variation of the cost of capital, the model has the following form:

$$BAS_i = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Volume_i + \beta_4 Volatility_i + \\ + \beta_5 FreeFloat_i + \varepsilon_i \quad (1.2)$$

In this case, I want to estimate the relationship between bid-ask spread and the adoption of an international accounting standard controlling the regression for variables like the

firm's size, the firm's trading liquidity, the price return volatility and the free float percentage.

In the case in which the trading volume is used as proxy for the variation of the cost of capital, the model has the following form:

$$VTR_i = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Volatility_i + \beta_4 FreeFloat_i + \varepsilon_i \quad (1.3)$$

In this case, I want to estimate the relationship between volume turnover and adoption of an international accounting standard, controlling the regression for variables such as the size, the volatility and the free float percentage.

Finally, in the case in which I use the returns volatility as proxy for the variation of the cost of capital, the model has the following form:

$$Volatility_i = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 FreeFloat_i + \beta_4 Beta_i + \varepsilon_i \quad (1.4)$$

In this case, I want to estimate the relationship between the return volatility and the adoption of an international accounting standard, controlling the relation for variables as the firm size, the free float percentage and the market correlation.

Estimations of these models are made with the OLS methodology. In order to obtain efficient and unbiased estimates it is necessary to analyze the relatively problems.

1.6.2 Estimation's problems

The models' estimations are made with the methodology of minimizing the sums of squared residuals, namely the OLS, which as the Gauss-Markov theorem said, gives among the class of the correct estimators those with lower variance.

So for this to happen, it is necessary that the basic hypotheses of that methodology are respected. Hypotheses' violations could be given by the presence of collinearity amongst explanatory variables, presence of heteroskedasticity amongst residuals and

non-random nature of the dummy variable IR[39] indicating the accounting strategy adopted.

1.6.3 Collinearity analysis.

If the explanatory variables are collinear, namely strongly correlate, the estimations given by minimizing the sums of squared residuals are biased. To verify the presence of collinearity amongst variables I use the Variance inflation factor VIF test, which is a regression diagnostic suggested by Belsley, Kuh, and Welsch (1980). To calculate the VIF of a variable, it is required to express the variable in function of the other, to estimate it with the OLS regression and to calculate the $1/ (1-R^2)$ statistic.

Table 1.5 shows the VIF value for each variable. Generally it is said that a VIF value around 5 can express the presence of collinearity, while a value of around 10 expresses the presence of strong collinearity. Results given are largely inferior at 5, therefore it is realistic assume no presence of collinearity among variables.
Other confirmations emerge from the analysis of the correlation matrix, which does not report significant high correlation coefficients.

1.6.4 Heteroskedasticity problem.

The heteroskedasticity problem is present when the variance of residuals is not constant, biasing the estimators obtained by minimizing the sums of squared residuals. To verify the presence of heteroskedasticity with the data used, I use the test proposed by White (1980). Results, reported in table 1.4, confirm the presence of heteroskedasticity for the bid-ask model and for the volatility model. To solve this problem, the scale of the measure of some variables with the logarithmic transformation has been changed.
After this transformation the models become:

[39]The same problem has characterized the Leuz and Verecchia (2000) analysis for German firms, while being insignificant in the Botosan (1997) analysis.

$$Log(BAS_i) = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Log(Volume_i) + \\ + \beta_4 Log(Volatility_i) + \beta_5 Log(FreeFloat_i) + \varepsilon_i \quad (1.5)$$

for the bid-ask spread model, and

$$Log(Volatility_i) = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 FreeFloat_i + \beta_4 Beta_i + \varepsilon_i \quad (1.6)$$

for the volatility model, while the trading volume model remains unchanged.
Table 1.4 reports results of White tests on the modified models and shows absence of heteroskedasticity.

1.6.5 The self selection problem.

Another incompatibility with the hypothesis of the OLS methodology is the problem of self selection. Amongst the characteristics of the OLS regression there is the random nature of the explanatory variables. The choice to adopt an international accounting standard is not a random event, but the result of a precise choice. For this reason, the estimations obtained minimizing the residual sums of squares could be biased. The solution of this problem is obtained using the methodology proposed by Heckman (1979), in which residuals are corrected with a term called "Inverse of Mill's ratio". The Inverse of Mill's ratio is estimated with the help of a probit model on the dummy variable *IR* indicating the adoption or not of an international accounting standard. The probit model associate to *IR* would explain the relationship between the probability of adopting an international accounting strategy and some firm characteristics.

1.6.5.1 The accounting system model.

The adoption of an international accounting standard is compatible with more characteristics of the listed companies. The relative scientific literature reports evidence of a

significant relation between the firm size, the operating performance, the share structure, the financing leverage, the necessary of financing resources, the foreign listing and the following of the analysts. On the basis of this evidence the probit model utilized is the following:

$$P(IR_i = 1) = \Phi(\beta_0 + \beta_1 \log(MV_i) + \beta_2 ROA_i + \beta_3 Lev_i + \beta_4 Pff_i + \beta_5 Salg_i + \beta_6 Inter_i + \mu_i) \quad (1.7)$$

where IR_i *international reporting* is a dummy variable that assumes the value of 1 if the *i*-firm adopts an international accounting standard, 0 otherwise. Explanatory variables are *MV market value* for firms' dimension, *ROA* as measure of the operating performance, *Lev* as indication of the variation rate of the financing leverage, *Pff* as the percentage of free float, *Salg* as the three year average sales growth rate, Inter as another dummy variable with a value of 1 if the i-firm is listed in foreign markets.
To estimate this model, I use a Likelihood method that, using a hypothesis less restrictive than those of the OLS, does not consider the existence of problems related to the presence of heterosckedasticy among residuals.

The expected relations between dependent and explanatory variables are all positive except for the financing leverage that should show an inverse relation with the probability to adopt an international accounting standard.

Table 1.6 reports the results of regression. Not all the explanatory variables have the expected sign: ROA and Free Float show insignificant negative signs, while the Lev is still insignificant but positive. The explanatory power of the model is not high and results are inferior in respect to the similar model proposed by Leuz and Verecchia (2000). A plausible motivation that helps to explain the contrary trend of the ROA is identifiable in the trend of the economic cycle, which unlike the last few years of the 90's, has negatively incised on the firms' performance, on the market liquidity, on the firms' expansions and on the trust of the investors.

The estimation of the accounting system model is due to the necessity to solve the self selection problem in the cost of capital models; for this reason the attention on the accounting system model is not high. Moreover, if the objective is to explain the motivation of the choice of an international accounting standard, it would be more op-

portune to make an analysis at the time of switch for each company from a local accounting standard to an international one.

1.6.6 Proposed models.

The necessary modifications to solve estimations problems and, hence, to make the models compatible with the characteristics of the OLS regression such as to obtain esteem that is less biased possible, has led to the proposition of the following three models:

Bid-ask spread model:

$$Log(BAS_i) = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Log(Volume_i) + \\ + \beta_4 Log(Volatility_i) + \beta_5 Log(FreeFloat_i) + \beta_6 Inv.Mill's\ ratio_i + \varepsilon_i \quad (1.8)$$

Trading Volume model:

$$VTR_i = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Volatility_i + \\ + \beta_4 FreeFloat_i + \beta_5 Inv.Mill's\ ratio_i + \varepsilon_i \quad (1.9)$$

Share volatility model:

$$Log(Volatility_i) = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 FreeFloat_i + \\ + \beta_4 Beta_i + \beta_5 Inv.Mill's\ ratio_i + \varepsilon_i \quad (1.10)$$

1.7 Empirical results.

The models estimations are done using the ordinary least square regressive technique. The three used models emerged from the building process described in the previous paragraph. The purpose of this process is to achieve conformity with the basic hypotheses of OLS technique in order to obtain unbiased estimations. Interestingly, the models proposed seem to present neither the collinearity problem among explanatory variables, nor the heteroskedasticity problem of the residuals. Finally, the models are corrected in their error components by the addition of the Inv. Mill's ratio to consider the non-random nature of the IR variable.

1.7.1 Bid-ask spread

Previous empirical evidences and theoretical predictions reported in literature suggest that the bid-ask spread is negatively associated with the quantitative level of public information, with the trading liquidity and with the free floating of the share, while it is positively associated with the shares return volatility.

Regression results of the bid-ask spread model are reported in table 1.7. The signs of the estimate coefficients are all in line with the expectations and the estimations are all statistically significant at a level higher than 99%, except for the constant. A decrease of the bid-ask spread results to be positively associated with the adoption of an international accounting standard. Results are in line with Leuz and Verecchia (2000), with Walker (1995) and with Amihud e Mendelson (1986). Furthermore, the marginal effect of the dummy variable IR is also economically significant. In fact, considering the antilogarithmic of the estimated coefficient, the model suggests that the adoption of an international accounting system is associated with a reduction of the bid-ask spread in average of 45 percent. The decrease of the bid-ask spread results to be positively associated at the market valuation, at the free floating percentage and at the daily change share volume, while resulting to be negatively associated at the standard

deviation of the shares' price return. The explanatory power of the model is high with an Adj- R^2 of the 90.36%.

The result of a lower bid-ask spread for the firms that adopt an international accounting standard confirms the first hypothesis, according to which an increase of the quantitative level of the information generates in average a savings of the cost of capital as consequence of a decrease in the asymmetric information between asking and offering of securities.

In table 1.7 results are reported of two regressions that are different because in the first, in column I, the estimation is made without adding the Inv. Mill's ratio term at the error term. It is observable that the adding of the Inv. Mill's ratio term increases both the explanatory power of the model and the significant level of the variable, especially that of the IR variable. Moreover, the estimate coefficient of the Inv. Mill's ratio is statistically significant, which demonstrates that the addition of it is a correct operation to solve the distortion given by the self selection.

1.7.2 Trading Liquidity

Previous results reported in literature suggest that the trading liquidity is positively related with the return volatility, while it could be either positively or negatively related to the market dimension and with the free floating.

Regression's results on the trading volume model are summarized in table 1.8. The trading liquidity is measured by the median of the daily volume turnover ratios VTR_i defined as the number of shares exchanged divided by the total number of shares outstanding. It is observed on the period from 01/01/2004 to 12/31/2004. Estimated coefficients result to be not statistically significant. After the correction of the residuals with the adding of the Inv. Mill's ratio, the estimation of the dummy variable IR still remains insignificant (p-value 0.3534) even if the direction remains in line with the theoretical prediction. Thus, the results are not in line with the results of Leuz and Verecchia (2000), of Healy, Hutton and Palepu (1999) and of Bartov and Bodnar (1996). Market capitalization, percentage of free float and return volatility result to be positively related with the choice to adopt an international accounting standard. The

explanatory power of the model is discreet with an Adj-R^2 of 37.44%. Therefore, results here obtained seem not to confirm with the second hypothesis, according to which an increase in the quantitative level of the information produces a reduction of the cost of capital as consequence of an increase of the trading liquidity. It is notable that the univariate analysis reported in table 1.3 shows a significant positive correlation, therefore in line with the hypothesis.

Table 1.8 reports two estimations differentiate themselves by the adding of the Inv Mill's ratio. Results show that the adding of the Inv. Mills ratio does not increase the explanatory power of the model in which the Adj-R^2 decreases to 37.44 from 37.67%. Moreover, the estimated coefficient of the Inv. Mill's ratio results to be insignificant showing that the adding of it does not contribute to solving the bias given by the self selection problem.

1.7.3 Share Volatility

The effect of disclosure on volatility can be different and complex as suggested by Bushee and Noe (2000), because it may depend on many factors, some of them unrelated to information asymmetry. Generally, more disclosures reduce information asymmetry with a consequential decrease in price fluctuations, as suggested by Brown et al. (2004) and by Welker (1995). But, when investors are more informed, their expectations about future cash flows become more variable because of the different investors' ability to transform public information in private information, generating higher informative asymmetries among investors. The consequences is of an increase in the price volatility, in line with the results obtained by Lang and Lundhom (1993), who, contrarily to their hypothesis, report evidence that the volatility level increases with the increasing of the level of public information.

The same result emerges from the estimation of the volatility model here proposed. The results, summarized in table 1.9, column II, show that the estimation of the coefficient of the dummy variable IR is positive ($\beta_1 = 0.2557$) and statistically different from zero (p-value = 0.0665) for a significant level higher than 90%. This result is in

line with those found by Leuz and Verecchia (2000) for German companies. Therefore, the return volatility seems to increase for firms that, adopting an international accounting system, increases the level of its disclosures. Another piece of evidence that increases the uncertainty of the results, emerges from the analysis of the correlation coefficients among variables, reported in table 1.3. It is observable that the correlation coefficient between volatility and adoption of an international accounting strategy is negative, even if insignificant.

The estimation of the other coefficients show that the volatility is negatively associated with the market capitalization and is positively associated with the market correlation that is measured by the beta index, while an insignificant negative association with the free float also emerges. Therefore, results confirm the third hypothesis, showing the existence of a different level of volatility for the firms that adopt an international accounting standard.

Table 1.9 reports two estimations that are different from the adding of the Inv. Mill's ratio. Results show, in line for what happened for the bid-ask spread model but not for the trading volume model, that the adding of the Inv. Mill's ratio increases both the explanatory power of the model and the significant level of the estimated coefficients; significantly different from the zero estimation of the dummy variable IR, that in the case of no correction results to be insignificant.

Moreover, it is observable that the Inv. Mill's ratio coefficient is statistically significant at a level higher than 95%; this shows that the adding of it in the volatility model is a correct operation to solve the bias given by the presence of self selection.

1.8 Results' Robustness

To check the robustness of the obtained results, situations that can characterize the proposed model are considered and analyzed. Is it opportune to verify the impact of eventually omitted or substitutive variables without forgetting the eventuality of a simultaneous impact by the adoption of an international accounting strategy on the variables used as tools to measure the cost of capital.

1.8.1 Simultaneity.

The adoption of an international accounting strategy could be endogenously determined by the variables used as proxies. That means the firms that opt for an international standard are those that achieve certain levels of bid-ask spread, of trading liquidity and of return volatility. To test this, I estimate a simultaneous equations system in which variables like the bid-ask spread, the trading liquidity and the return volatility are endogenously considered. The system used is opportunely modified with respect to the previous models' equations, both for relating the endogenous variables and for satisfying the necessary criterions to solve the equations system: the identification problem and the rank conditions.

The system used is the following:

$$\begin{cases} P(IR_i = 1) = \Phi(\beta_{10} + \beta_{11} Log(BAS_i) + \beta_{12} Log(VLTY_i) + \beta_{13} Log(MV_i) + \beta_{14} FreeFloat_i + \beta_{15} FEx_i + \beta_{16} Sa\lg_i + \mu_i) & (1.11) \\ Log(BAS_i) = \beta_{20} + \beta_{21} IR_i + \beta_{22} Log(MV_i) + \beta_{23} Log(VLME_i) + \beta_{24} Log(VLTY_i) + \beta_{25} FreeFloat_i + \varepsilon_{2i} & (1.12) \\ VTR_i = \beta_{30} + \beta_{31} IR_i + \beta_{32} \log(MV_i) + \beta_{33} \log(VLTY_i) + \beta_{34} FreeFloat_i + \varepsilon_{3i} & (1.13) \\ Log(VLTY_i) = \beta_{40} + \beta_{41} IR_i + \beta_{42} \log(MV_i) + \beta_{43} FreeFloat_i + \beta_{44} Beta_i + \varepsilon_{4i} & (1.14) \end{cases}$$

in which the variables IR, Log(Bid Ask), VTR and Log(VLTY) are considered endogenous. The solution of this system is obtained with a mixed, two-stage procedure, because of the simultaneous presence of discreet and continuous variables. The approach used is that reported in Maddala (1983). From the reduced[40] form of each model, it is obtained the estimation of each endogenous variable that is subsequently used as instrument to estimate the system. This is to outline that the estimation of the first model is made with the likelihood method, due to its probabilistic nature, while the other estimations are made with the OLS. Solutions, reported in table 1.10, show, first, that the choice of an accounting system is not a function of the bid-ask spread and of the return volatility levels, and second, that its adoptions has a conjoint effect especially on the bid-ask spread and on the return volatility. Moreover, results remain in line with those

[40]Form in which each endogenous variable is expressed in function of only exogenous variables.

obtained from the previous OLS regression: the bid-ask spread still shows a significant negative association with the adoption of an international accounting strategy (β_{21} = -0.8064; p-value = 0.0063), the return volatility still to be positively associated (β_{41} = 0.3345; p-value = 0.0549), while negative but insignificant (β_{31} = -0.0006; p-value = 0.3899) is the association between trading liquidity and the adoption of an international accounting strategy. Therefore, these results confirm those previously observed, serving to increase the doubt on the simultaneously or consequentially of the effects. This doubt could be resolved using a different analysis method like an event study.

1.8.2 Omitted variables

The share price could be an omitted variable in the models used. In fact, the bid-ask spread could be influenced by the price, considering that for different levels of price the minimum spread changes. Moreover, it is possible that the price level can influence the trading liquidity and the return volatility independently from the accounting strategy adopted. For testing this, an estimation of the models is again used, adding the average price as a further control variable.

Regressions show results, which are reported in table 1.11, in line with those previously obtained. The adding of the average price to the bid-ask spread model confirms the existence of an inverse and statistically significant association between the adoption of an international accounting standard and the bid-ask spread variation. Moreover, the t-student's test shows that the estimation of the price variable is statistically different from zero, therefore its adding helps to explain further the error structure, increasing the explanatory power of the model.

The estimation of the volatility model with the adding of the average price again shows results in line with those previous observed, confirming the existence of a significant positive relation between the adoption of an international accounting standard and the variation of the volatility level. In this case, however, the estimation of the added variable is not statistically significant and does not contribute to an increase of the explanatory power of the model. Finally, the adding of the average price to the trading volume model shows again a positive but insignificant association between the

adoption of an international accounting strategy and the variation of the trading liquidity, even if its estimation, statistically significant, helps to explain the error structure, increasing the explanatory power of the model.

1.8.3 Others tests

The models used measure separately the impact on the bid-ask spread, on the trading volume and on the share price volatility. The change of the accounting strategy should have a conjoint effect on the three variables. So, their contemporary presence in a regressive model can attenuate the evidence. Especially, the presence of the volume turnover variable in the bid-ask model and the presence of the volatility variable in the trading volume model could attenuate the evidence of the relation with the variable indicating the adoption of an international accounting system. To verify that, I exclude the volume turnover ratio variable from the bid-ask spread model and the volatility variable from the trading volume model. Results, not reported here, show more consistent estimation for coefficients confirming a significant negative association between the adoption of an international accounting standard and the bid-ask spread, and again a positive but not statistically significant with the trading liquidity.

Finally, the use of substitutive variables in the proposed models contributes to shows the results' robustness. The share turnover and the free float utilized as proxy of trading liquidity and presence of institutional investors are substituted from the turnover amount of Swiss francs and from the quota of institutional investors respectively. Results of this new regressions are again in line with the previous, confirming once more significant negative and positive associations between the adoption of an international accounting standard and the bid-ask spread and the volatility respectively, with a positive but again not significant association with the trading liquidity.

1.9 Economic magnitude

The analysis shows that the companies that adopt an international accounting standard benefit of an average reduction of the bid ask spread of 45% compared with the companies that adopt a local accounting standard. These reductions are not only statistically

significant, but also economically significant. In fact, a reduction of the BAS has a positive consequence on the firm cost of capital.

To stress the economic magnitude, a possible way is to use the Hail evidence (2002). Hail analyzes the relationship between disclosure quality and cost of equity capital for a sample of Swiss listed firms. Using a disclosure score elaborated by the Swiss Banking Institute of the University of Zurich, he quantifies the effect of the firms' voluntary disclosure policy on its implied cost of capital. Hail reports evidence that a sample of Swiss firms with better value-rating benefits of lower cost of equity capital from 1.8 to 2.4% in respect to the Swiss firms with a worst value-rating. Using this evidence, my aim is to estimate the magnitude of the cost of capital's variation in function of the firm's BAS variation. The first step is to estimate the relationship between firms' BAS and the firm's disclosure score. For this purpose, I estimate a regressive model that relates the BAS to the disclosure score controlling the relationship by firm size, the volatility and cross-listings. For disclosure score, I use the same disclosure score used by Hail computed for the fiscal year 2004. Like Hail, I use a fractional ranking score such as values near 0 to indicate a high value-rating and values near 1 to indicate a low value-rating. The explanatory variable is the logarithmic of daily average Bid Ask Spread. Table 1.12 reports the estimation's results. The estimation shows that the BAS has an average change of 31% between firms with better and those with worst value-ratings. Doing a comparison with the Hail results, it make sense to assume that for a Swiss's sample a BAS reduction of 31% corresponds to a reduction of between 1.8 and 2.4% of the cost of equity capital. That means, for each percentage reduction of the BAS there is a reduction between 5.8 and 7.2 bps of the cost of equity capital. This deduction can be used to estimate the magnitude of the cost of capital saved due to the adoption of an international accounting standard. Considering that in average the reduction of the BAS for firms that adopt an IAS is of 45%, the magnitude of the reduction of the cost of capital can be estimated between the 2.6 and 3.4%.

1.10 Conclusions

In this study, I analyzed the relationship between the quantitative level of information and the firm's cost of capital. The theoretical prediction suggests a paradigm according to which an increase in the quantitative level of disclosure determines a decrease in the firm's cost of capital as consequence of a reduction of the asymmetric information between firms and shareholders. The analysis of the cost of capital is focused on the measure of its asymmetric component through the analysis of the variation of the bid-ask spread, of the trading liquidity and of the share price volatility. The approach used is that of the cross sectional analysis through the estimation of three models that relate the three variables to the adoption of an international accounting strategy. Regressions are made with the OLS technique that imposes the correction of the residuals of each model considering the non-random nature of the adoption of an international accounting standard that arises from a voluntary manager decision.

The tests completed accept the first and the last of the three hypotheses made in this study. Results confirm the existence of a statistically significant association between the adoption of an international accounting strategy and the two variables of bid-ask spread and return's volatility, confirming in line with the hypothesis a negative association and a positive association, respectively. Results of relation with the trading liquidity turned out to be insignificant.

The robustness of these results is confirmed from further analysis. The adding of the share price as an ulterior control variable in the three models confirms the results previously obtained. Also, the substitution of variables as the percentage of free float and the percentage of trading volume with variables like the participation quota of institutional investors and the trading amount of Swiss French shows the same results. Finally, the estimation of a simultaneous system in which the explanatory variable are endogenously definite, suggest the same conclusions.

The estimation of the accounting system model, necessary for solving the self selection problem, shows the existence of common characteristics for Swiss firms that have adopted an international accounting strategy. So, like the univariate analysis shows, the firms that adopt an international accounting strategy are those that on aver-

age have larger market value, higher market liquidity level, bigger daily turnover volume, higher degrees of financial leverage, higher rate of revenue growth, major percentage of free float, high correlation with the market index, lower bid-ask spread, lower volatility and a more contained return on invested capital. Nevertheless, the accounting system model used isn't analyzed accurately because it isn't the aim of this study and that could be indication for future research.

This study also accepts only the first and the last hypothesis, rejecting the second on the trading liquidity. The rejection of this hypothesis could be motivated not from the absence of consequences coming from the adoption of an international accounting system, but from the hiding of those consequences from consequences that come out from the economic cycle that has characterized the exchange markets from 2001 to 2005. In fact, this period of time was characterized by a general decrease in the market liquidity level and by a substantial increase of the uncertainty that could have overwhelmed the consequences coming out from the adoption of an international accounting standard. That suggests the use of a different method in the future research.

In conclusion, this study confirms the theoretical prediction that listed firms that adopt an international accounting strategy benefit from a reduction in the cost of capital as a consequence of a reduction in the asymmetric information level. What could spontaneously be asked of us is the reason, considering the saving that derives, that all firms do not adopt an international accounting standard. Probably the answer is that its adoption involves a series of added costs that are not for all inferior to the benefits. As highlighted by Joos (2000) relative to the Leuz and Verecchia (2000) study, such research design is not able to answer the posted question. The answer must be found in a different method of research in which specific factor of costs and benefits deriving from the adoption of an international accounting strategy are identified. What can be observed, as suggested in Ball, Robin and Wu (2000), is that for Swiss firms too, those that are foreign listed opt all for an international accounting standard, confirming the idea that disclosing results in a unique standard is less costly than disclosing them to different standards.

1.11 References

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1.12 Tables

TABLE 1.1: Sample Selection Procedures

Panel A: Sample selection	*Number*	*Percent*
Firms listed in SPI	229	100.0
Financial firms	52	22.7
Firms with insufficient data	18	7.9
Total sample firms	159	69.4

The sample is composed of firms included in the SPI Swiss Performance Index on the 31st December 2004. Financial firms are firms that belong to the sectors of bank, insurance and asset management. For insufficient data are considering firms for which is not available the information of the accounting standard used (10), the data on the last bid and last ask (3) and more of two information on firm's characteristics (5).

Panel B: Sample by Accounting Standard	*Number*	*Percent*
All firms	159	100.0
Firms following Local Standard	59	37.1
of which with some EEC guidelines	10	16.9
Firms following International Standard	100	62.9
of which IAS/IFRS	90	90
of which U.S. GAAP	10	10

The sample is composed of firms included in the SPI Swiss Performance Index at December 31rst, 2004. The information about the accounting standard followed came from Worldscope database. 10 of the 59 Firms with a local accounting standard complete their disclosure with some EEC guidelines.

TABLE 1.2: Descriptive Statistics

Firm Characteristics						
Variable	Reporting	Mean	Median	Max	Min	Std. Dev
Firm Size	if IR=0	645.42***	166.40*	19757.7	3.91	2574.29
MV	if IR=1	5798.17***	446.86*	152999.1	8.07	21363.33
	All	3886.14†	282.96†	152999.1	3.91	17164.94
Bid-ask spread	if IR=0	0.0403*	0.0210*	0.2625	0.0024	0.0503
BAS	if IR=1	0.0116*	0.0074*	0.0650	0.0010	0.0125
	All	0.0222†	0.0096†	0.2625	0.0010	0.0349
Liquidity	if IR=0	0.0008	0.0005*	0.0074	0	0.0012
VTR	if IR=1	0.0016	0.0011*	0.0065	0	0.0015
	All	0.0013†	0.0008†	0.0074	0	0.0015
Volatility	if IR=0	0.0203	0.0174	0.0452	0.0079	0.0085
VLTY	if IR=1	0.0187	0.0168	0.0445	0.0066	0.0082
	All	0.0193†	0.0172†	0.0452	0.0066	0.0083
Volume	if IR=0	22.41	0.2	1089.9	0	134.13
VLME	if IR=1	228.90	5.85*	8429	0	1012.17
	All	152.28††	1.2†	8429	0	812.07
Profitability	if IR=0	0.0433	0.0362	0.1927	-0.0597	0.0467
ROA	if IR=1	0.0374	0.0555	0.3049	-0.4042	0.1051
	All	0.0396†	0.0502†	0.3049	-0.4042	0.0878
Leverage	if IR=0	0.3218**	0.2710	3.8210	-18.872	2.7068
LEV	if IR=1	0.3781**	0.2540	3.1419	-1.419	0.5415
	All	0.3572†	0.2610†	3.8210	-18.872	1.6953

MV is the firm's Market Value (in millions of Swiss francs) as observed on December 31rst, 2004. BAS is the firm's average bid-ask spread ratio (difference between last daily bid and ask traded divided by the average sum between last daily bid and ask traded) and is observed from 1.1.04 to 31.12.04. VTR is the median of the daily volume turnover ratio (daily number of shares changed divided by total number of outstanding shares) and is observed from 1.1.04 to 31.12.04. VLTY is the firm's return volatility (standard deviations of daily price's returns from 1.1.04 to 31.12.04). VLME is the firm's volume (average of the daily numbers of shares changed express in thousands) and is observed from 1.1.04 to 31.12.04. ROA is the three year average of the firm's profitability (operating income divided by total asset) and is calculate from 2002 to 2004. LEV is the firm's three year average financing leverage (long term debt divided by common equity) and is calculated from 2002 to 2004.

TABLE 1.2: *CONTINUED*

Firm Characteristics						
Variable	Reporting	Mean	Median	Max	Min	Std. Dev
Sales Growth	if IR=0	0.0441	0.0396	0.5361	-0.5726	0.1577
SALG	if IR=1	0.4243	0.0502	33	-0.3944	3.3088
	All	0.2832	0.0417†	33	-0.5726	2.6274
Foreign Listing	if IR=0	0.3051*	0*	1	0	0.4644
INTER	if IR=1	0.8*	1*	1	0	0.4020
	All	0.6163†	1†	1	0	0.4878
Beta	if IR=0	0.7039*	0.623*	2.566	0.018	0.4492
BETA	if IR=1	1.1041*	1.086*	2.867	0.033	0.5618
	All	0.9546†	0.863†	2.867	0.018	0.5557
Free Float	if IR=0	0.5751	0.60	1	0.16	0.2471
FF	if IR=1	0.6181	0.63	1	0.14	0.2555
	All	0.6031†	0.61†	1	0.14	0.2526

SALG is the three years average sales growth rate (yearly variation in sales divided by previous year sales) and is calculated from 2002 to 2004. INTER is a dummy variable indicating if the firm is listed in foreign exchange market (1 if yes, O otherwise) and is observed at December 31rst, 2004. Beta is the firm's correlation with the SPI Index and is observed at December 31rst, 2004. FF is the firm's Free Float (percentage of share's floating) and is observed at December 31rst, 2004. IR is a dummy variable indicating whether (1 if yes, O otherwise) the firm adopts an international accounting standard during 2004. * (†), **(††) and *** (†††) indicating that the test of differences in mean or in median (that the relative measure is different from zero) are (is) statistically significant at a level of 99, 95 and 90 percent respectively. Data on the accounting standard are obtained from Worldscope database and the others from Datastream.

TABLE 1.3: Correlations

Pearson Correlation Coefficients for Firm Characteristics

Variable	IR	MV	BAS	VTR	VLTY	VLME	ROA	LEV	SALG	INTER	BETA
MV	0.145										
	(0.067)										
BAS	-0.398	-0.129									
	(0.000)	(0.105)									
VTR	0.270	0.170	-0.354								
	(0.001)	(0.032)	(0.000)								
VLTY	-0.092	-0.192	0.541	-0.098							
	(0.247)	(0.015)	(0.000)	(0.218)							
VLME	0.123	0.538	-0.108	0.265	-0.037						
	(0.122)	(0.000)	(0.174)	(0.001)	(0.646)						
ROA	-0.033	0.160	-0.250	0.176	-0.535	0.066					
	(0.682)	(0.045)	(0.002)	(0.027)	(0.000)	(0.407)					
LEV	0.016	-0.015	0.196	-0.018	0.031	0.050	-0.046				
	(0.840)	(0.853)	(0.014)	(0.824)	(0.698)	(0.533)	(0.567)				
SALG	0.070	-0.022	0.047	-0.040	0.236	-0.017	-0.299	-0.016			
	(0.380)	(0.785)	(0.553)	(0.620)	(0.003)	(0.829)	(0.000)	(0.839)			
INTER	0.492	0.170	-0.435	0.394	-0.092	0.148	0.097	-0.114	0.080		
	(0.000)	(0.033)	(0.000)	(0.000)	(0.248)	(0.063)	(0.226)	(0.153)	(0.316)		
BETA	0.349	-0.062	-0.287	0.427	0.238	0.240	-0.076	-0.039	0.053	0.417	
	(0.000)	(0.436)	(0.000)	(0.000)	(0.003)	(0.002)	(0.342)	(0.622)	(0.507)	(0.000)	
FF	0.046	0.067	0.066	0.029	0.044	0.119	-0.156	0.068	0.099	-0.031	-0.019
	(0.581)	(0.417)	(0.423)	(0.723)	(0.593)	(0.151)	(0.059)	(0.414)	(0.229)	(0.712)	(0.817)

MV is the firm's Market Value. BAS is the firm's average bid-ask spread ratio (difference between ask and bid divided by the average sum between bid and ask). VTR is the median of the daily volume turnover ratios (daily number of shares changed divided by total number of outstanding shares). VLTY is the

return's volatility (standard deviations of daily price's returns). VLME is the volume (daily average numbers of shares changed). ROA is the three year average of the firm's profitability (yearly operating income divided by total asset). LEV is the firm's three years financing leverage (average yearly long term debt divided by common equity). SALG is the three years average sales growth rate (average yearly variation in sales divided previously sales). INTER is a dummy variable indicating if the firm is listed in foreign exchange market (1 if yes, 0 otherwise). Beta is the firm's correlation with the SPI Index. FF is the firm's Free Float (percentage of share's floating). IR is a dummy variable indicating whether (1 if yes, 0 otherwise) the firm adopts an international accounting standard during 2004. MV, ROA, LEV, SALG, INTER, FF are observed at the December 31rst, 2004 and BAS, VTR, VLTY, VLME, from 1.1.2004 to 31.12.2004. All calculations are based on 159 observations except ROA, BETA and FF that are calculate on 158,158 and 152 observations respectively. The p-values in parentheses are for a two-tail test of statistical significance.

TABLE 1.4: Heteroskedasticity

White Heteroskedasticity tests

Model	No cross analysis nR^2	No cross analysis F-stat	Cross analysis nR^2	Cross analysis F-stat	Presence of Heteroskedaticity
BAS	32.89	21.66*	47.75	36.19*	Yes
Log(BAS)	13.46	14.68***	31.94	36.19*	No
VTR	4.11	12.01***	6.79	19.81***	No
VLTY	34.41	18.47*	39.57	27.68*	Yes
Log(VLTY)	14.46	18.47*	18.62	19.81***	No

White Heteroskedasticity test: if the *nR-squared* statistic is less than the critic *F- value* then the null hypothesis of absence of error's heteroskedasticy is accepted . *, **, *** indicate a significance level of 99, 95 and 90 percent respectively. The models are:

$$BAS_i = \beta_0 + \beta_1 IR_i + \beta_2 Log(MV_i) + \beta_3 VLME + \beta_3 VLTY_i + \beta_5 FreeFloat_i + \varepsilon_i$$

$$Log(BAS_i) = \beta_0 + \beta_1 IR_i + \beta_2 Log(MV_i) + \beta_3 Log(VLME_i) + \beta_3 Log(VLTY_i) + \beta_5 Log(FreeFloat_i) + \varepsilon_i$$

$$VTR_i = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Volatility_i + \beta_4 FreeFloat_i + \varepsilon_i$$

$$Volatility_i = \beta_0 + \beta_1 IR_i + \beta_2 Log(MV_i) + \beta_3 FreeFloat_i + \beta_4 Beta_i + \varepsilon_i$$

$$Log(Volatility_i) = \beta_0 + \beta_1 IR_i + \beta_2 Log(MV_i) + \beta_3 FreeFloat_i + \beta_4 Beta_i + \varepsilon_i$$

MV is the firm's Market Value (in millions of Swiss franc) and is observed at December 31rst, 2004. BAS is the firm's average bid-ask spread ratio (difference between last daily ask and bid divided by the average sum between last daily bid and ask) and is observed from 1.1.04 to 31.12.04. median of daily volume turnover ratio (daily number of shares changed divided by total number of outstanding shares) and is observed from 1.1.04 to 31.12.04. VLTY is the firm's return volatility (standard deviations of daily price's returns from 1.1.04 to 31.12.04). VLME is the firm's volume (daily average share's turnover) and is observed from 1.1.04 to 31.12.04. Beta is the firm's correlation with the SPI Index and is observed at December 31rst, 2004. Firm's Free Float is the percentage of share's floating and is observed at December 31rst, 2004. IR is a dummy variable indicating whether (1 if yes, 0 otherwise) the firm adopts an international accounting standard during 2004. Data on the accounting standard are obtained from Worldscope database and the others from Datastream

TABLE 1.5. Variance Inflation Factors

Panel A: Bid-ask spread model		
Variable	R squared	VIF
MV	0.3306	1.49
Volatility	0.0499	1.05
Free Float	0.0624	1.07
Volume	0.3021	1.43
IR	0.0407	1.04
Panel B: Trading Volume model		
Variable	R squared	VIF
MV	0.0817	1.09
Volatility	0.0422	1.04
Free Float	0.0543	1.06
IR	0.0389	1.04
Panel C: Volatility model		
Variable	R squared	VIF
MV	0.0795	1.09
Free Float	0.1106	1.12
Beta	0.1686	1.2
IR	0.1301	1.15

The VIF statistic is used for analyze the presence of collinearity between variables. It's defined for each variable as the ratio 1/(1-R squared), where R squared is computed from OLS regression in which the variable is used as dependent variable and is a function of the others. Generally with VIF around the value of 5, the variable may suffer for collinearity. In this case all the VIF values are enough lower than 5.

TABLE 1.6: Accounting System Model
Probit Regression's Results

$$P(IR_i = 1) = \Phi(\beta_0 + \beta_1 \log(MV_i) + \beta_2 ROA_i + \beta_3 Lev_i + \beta_4 Pff_i + \beta_5 Sa\lg_i + \beta_6 Inter_i + \mu_i)$$

Accounting System Model *Variable*	*P(IR=1)*
Constant	-1.5753 (0.0026)
Log(MV)	0.2706 (0.0032)
ROA	-3.884 (0.0287)
LEV	0.0781 (0.2678)
Free Float	-0.0720 (0.8849)
SALG	0.0495 (0.8212)
INTER	0.9789 (0.0003)
McFadden	0.2424
Prob(LR/F-statistic)	0.0001
No. Obs	159

Table reports result of the Accounting System Model regression. The dependent variable is a dummy IR indicating whether the firm adopts an international accounting standard during 2004. MV is the firm's market value and Free Float is the percentage of share's floating and is observed at 31.12.2004. ROA, SALG and LEV are the three years average of firm's profitability (operating income divided by total asset), sales growth rate (yearly variation in sales divided by previously year sales) and financial leverage (long term debt divided by common equity) respectively , and are calculated from 2002 to 2004. INTER is a dummy variable indicating if the firm is listed in foreign exchange markets (1 if yes, O otherwise) and is observed at December 31rst, 2004. P-values of the t-test that the coefficient is different from 0 are in parentheses.

TABLE 1.7: Bid-ask spread model.
Regression's results

$$Log(BAS_i) = \beta_0 + \beta_1 IR_i + \beta_2 Log(MV_i) + \beta_3 Log(VLME_i) + \beta_3 Log(VLTY_i) + \beta_5 Log(FFt_i) + \beta_6 Inv.Mill's\ ratio + \varepsilon_i$$

Bid-Ask Spread Model *Variable*	*I*	*II*
Constant	0.0021 (0.9951)	0.2324 (0.5040)
IR	-0.2081 (0.0036)	-0.5886 (0.0005)
Log(MV)	-0.2137 (0.0000)	-0.1870 (0.0000)
Log(Volume)	-0.1265 (0.0000)	-0.1159 (0.0000)
Log(Volatility)	0.8035 (0.0000)	0.8437 (0.0000)
Log(Free Float)	-0.2636 (0.0001)	-0.2834 (0.0000)
Inv. Mill's ratio	-	21.4391 (0.0116)
R squared	0.8802	0.8863
Adj. R squared	0.8756	0.8809
Prob(F-statistic)	0.0000	0.0000
No. Obs	159	159

The dependent variable is the firm's average bid-ask spread ratio (difference between ask and bid divided by the average sum between bid and ask) observed from 1.1.04 to 31.12.04. IR is a dummy variable indicating whether the firm adopts an international accounting standard during 2004. MV is the firm's market value, Volume is the daily average share's turnover, Volatility is the standard deviations of daily price's returns and Free Float is the percentage of share's floating. MV and Free Float are observed at 31.12.2004 while Volume and Volatility from 1.1.04 to 31.12.2004. The Inv. Mill's ratio id added for adjust the error for the selection bias and is computed from the probit model. Column I and II show regression without and with Inv. Mill's ratio respectively. P-values of the t-test that the coefficient is different from 0 are in parentheses.

TABLE 1.8: Trading Volume model
OLS Regression's results

$$VTR_i = \beta_0 + \beta_1 IR_i + \beta_2 LogMV_i + \beta_3 Volatility_i + \beta_4 FreeFloat_i + \beta_5 Inv.Mill's\ ratio + \varepsilon_i$$

Trading Volume Model *Variable*	*I*	*II*
Constant	-0.0030 (0.0000)	-0.0029 (0.0000)
IR	0.0002 (0.3423)	0.0004 (0.3534)
Log(MV)	0.0004 (0.0000)	0.0004 (0.0000)
Volatility	0.0404 (0.0027)	0.0380 (0.0075)
Free Float	0.0016 (0.0001)	0.0016 (0.0001)
Inv. Mill's ratio	-	16.1322 (0.5484)
R squared	0.3932	0.3953
Adj. R squared	0.3767	0.3744
Prob(F-statistic)	0.0000	0.0000
No. Obs	159	159

The dependent variable is the median of daily volume turnover ratio (daily number of shares changed divided by total number of outstanding shares) observed from 1.1.04 to 31.12.04. IR is a dummy variable indicating whether the firm adopts an international accounting standard during 2004. MV is the firm's market value, Volatility is the standard deviations of daily price's returns, and Free Float is the percentage of share's floating. MV and Free Float are observed at 31.12.2004 while Volume and Volatility from 1.1.04 to 31.12.2004. The Inv. Mill's ratio is added for adjust the error for the selection bias and is computed from the probit model. Column I and II shows regressions without and with the Inv. Mill's ratio respectively. P-values of the t-test that the coefficient is different from 0 are in parentheses.

TABLE 1.9: Volatility model.
OLS Regression's results

$$Log\,(Volatility_{\ i}) = \beta_0 + \beta_1 IR_i + \beta_2 Log\,(MV_i) + \beta_3 FreeFloat_{\ i} + \beta_4 Beta_{\ i} + \beta_5 Inv.Mill's\ ratio + \varepsilon_i$$

Volatility Model *Variable*	*I*	*II*
Constant	-3.6094 (0.0000)	-3.6197 (0.0000)
IR	-0.0184 (0.7539)	0.2557 (0.0665)
Log(MV)	-0.1146 (0.0000)	-0.1371 (0.0000)
Free Float	-0.0509 (0.6202)	-0.0493 (0.6269)
Beta	0.3112 (0.0000)	0.2767 (0.0000)
Inv. Mill's ratio	-	19.1926 (0.0307)
R squared	0.4163	0.4349
Adj. R squared	0.4004	0.4154
Prob(F-statistic)	0.0000	0.0000
No. Obs	159	159

The dependent variable is the firm's volatility (standard deviations of daily price's returns) observed from 1.1.04 to 31.12.04. IR is a dummy variable indicating whether the firm adopts an international accounting standard during 2004. MV is the firm's market value, Free Float is the percentage of share's floating and Beta is the firm's correlation with the SPI Index. MV, Free Float and Beta are observed at 31.12.2004 while Volume and Volatility from 1.1.04 to 31.12.2004. The Inv. Mill's ratio is added to adjust the error for the selection bias and is computed from the probit model indicating the accounting choice. Column I and II show regressions without and with Inv. Mill's ratio respectively. P-values of the t-test that the coefficient is different from 0 are in parentheses.

TABLE 1.10: Simultaneous System.
Two Stage Regression's Results

Model *Variable*	*I* *P(IR=1)*	*II* *Log(BAS)*	*III* *VTR*	*IV* *Log(VLTY)*
Constant	-0.8458 (0.9378)	-0.4677 (0.7135)	0.0097 (0.0001)	-3.7638 (0.0000)
IR	-	-0.8064 (0.0063)	-0.0006 (0.3899)	0.3345 (0.0549)
Log(MV)	-0.4361 (0.7596)	-0.2929 (0.0006)	0.0007 (0.0000)	-0.1244 (0.0000)
Free Float	-1.024 (0.6323)	-0.5812 (0.0004)	0.0016 (0.0001)	-0.0365 (0.7256)
Log(VLTY)	0.7542 (0.6434)	0.3598 (0.3730)	0.0032 (0.0000)	-
Log(BAS)	-1.5965 (0.6197)	-	-	-
Log(VLME)	-	-0.0506 (0.2019)	-	-
Beta	-	-	-	0.2638 (0.0000)
Inter	0.4486 (0.5834)	-	-	-
Salg	0.0690 (0.6608)	-	-	-
McFadden/R squared	0.1947*	0.8219	0.4665	0.4462
Adj. R squared	-	0.8151	0.4502	0.4291
Prob(LR/F-statistic)	0.00001*	0.0000	0.0000	0.0000
No. Obs	159	159	159	159

The table shows the result of the second stage estimation of one simultaneous system of four equations in which the dependent variables are endogen definite. In the first model the dependent variable is a dummy IR indicating whether the firm adopts an international accounting standard during 2004. For the other models the continuous dependent variables are the firm's average bid-ask spread ratio (difference between ask and bid divided by the average sum between bid and ask), the firm's average volatility (daily return's standard deviation) and the daily average volume turnover ratio (daily number of shares changed divided by total number of outstanding shares) and are observed from 1.1.04 to 31.12.04. The model I is estimated with a ML method while the others are estimated with OLS method. MV is the firm's market value, Free Float is the percentage of share's floating, Volatility VLTY is the standard deviations of daily price's returns, Volume VLME is the daily average share's turnover, PRICE is the daily average share's price, Beta is the firm's correlation with the SPI Index, Inter is a dummy indicating if the company is listed in a foreign exchange market and Salg is the average sales growth rate from 2001 to 2004. MV, Free Float, Beta and Inter are observed at 31.12.2004 while Volume, Volatility and Price from 1.1.04 to 31.12.2004. P-values of the t-test that the coefficient is different from 0 are in parentheses.

TABLE 1.11: Price's Variable Added
OLS Regression's results

Model *Variable*	*I* *Log(BAS)*	*II* *Log(VLTY)*	*III* *VTR*
Constant	0.0062 (0.9828)	-3.614 (0.0000)	-0.0028 (0.0000)
IR	-0.5529 (0.0001)	0.2735 (0.0531)	0.0006 (0.3181)
Log(MV)	0.0895 (0.0396)	-0.1384 (0.0000)	0.0004 (0.0000)
Log(Free Float)	-0.0658 (0.2635)	-	-
Free Float	-	-0.0522 (0.6089)	0.0016 (0.0000)
Log(VLTY)	0.7583 (0.0000)	-	-
VLTY	-	-	0.0342 (0.0144)
Log(VLME)	-0.3364 (0.0000)	-	-
Log(PRICE)	-0.3107 (0.0000)	-	-
PRICE	-	-0.0001 (0.8173)	-0.0001 (0.0202)
BETA	-	0.2728 (0.0000)	-
Inv Mill's Ratio	21.873 (0.0049)	20.019 (0.0237)	19.381 (0.4019)
R squared	0.9237	0.4368	0.4170
Adj. R squared	0.9195	0.4133	0.3928
No. Obs	159	159	159

The dependent variables are the firm's average bid-ask spread ratio (difference between ask and bid divided by the average sum between bid and ask), the firm's average volatility (daily return's standard deviation) and the daily average volume turnover ratio (daily number of shares changed divided by total number of outstanding shares) for the models I, II and III respectively and are observed from 1.1.04 to 31.12.04. IR is a dummy variable indicating whether the firm adopts an international accounting standard during 2004. MV is the firm's market value, Free Float is the percentage of share's floating, Volatility VLTY is the standard deviations of daily price returns, Volume VLME is the daily average share's turnover, PRICE is the daily average share's price and Beta is the firm's correlation with the SPI Index. MV, Free Float and Beta are observed at 31.12.2004 while Volume, Volatility and Price from 1.1.04 to 31.12.2004. The Inv. Mill's ratio is added for adjust the error for the selection bias and it is computed from the probit model indicating the accounting system. P-values of the t-test that the coefficient is different from 0 are in parentheses.

TABLE 1.12: BAS and DScore model.
White Heteroskedasticity-Consistent Regression's results

$$Log(BAS_i) = \beta_0 + \beta_1\ DScore_i + \beta_2 Log(MV_i) + \beta_3\ VLTY\ + \beta_4 Inter_i + \varepsilon_i$$

Bid-Ask Spread and DScore Model *Variable*	*I*	*II*
Constant	-2.3944 (0.0000)	-3.4521 (0.0000)
DScore	0.4445 (0.0436)	0.3177 (0.0338)
Log(MV)	-0.4054 (0.0000)	-0.2823 (0.0000)
Volatility	-	39.311 (0.0010)
Inter	-	-0.6130 (0.0000)
R squared	0.7221	0.8245
Adj. R squared	0.7161	0.8166
Prob(F-statistic)	0.0000	0.0000
No. Obs	95	93

The dependent variable is the firm's average bid-ask spread ratio (difference between ask and bid divided by the average sum between bid and ask) observed from 1.1.04 to 31.12.04. DScore is the fractional disclosure score computed as the ratio between the 2004 firm' s value reporting rank and the maximum value reporting rank of the sample. The value reporting rank is yearly elaborate by the Swiss Banking Institute of the University of Zurich and is published in "Bilanz", a Swiss economic and business monthly magazine. MV is the firm's market value, Volatility is the standard deviations of daily price's returns and is a dummy variable indicating if the firm is listed in foreign exchange market (1 if yes, 0 otherwise). MV and Inter are observed at 31.12.2004 while Volume and Volatility from 1.1.04 to 31.12.2004. P-values of the t-test that the coefficient is different from 0 are in parentheses.

Chapter 2

Trading Liquidity, Asymmetric Information and Increase in Disclosure: Swiss evidence.

2.1 Abstract

The relationship between asymmetric information and trading liquidity is a relevant topic in finance and accounting theory. Theoretical prediction suggests that lower asymmetric information should increase the trading liquidity due to an increase of the investors' confidence. In this paper I empirically analyze the impact on variables such as the share volume and the volume turnover from the reduction of the firm's asymmetric information through the adoption of an international accounting standard. I hypothesize that there is an increase in the firm's trading liquidity as consequence of the switch to an international accounting standard, and that the magnitude of the increase is relatively higher for smaller firms. Analysis results confirm a median increase of about 10 percent of the time series share volume's means for a sample of 64 Swiss firms, while the magnitude of the increase doubles if only a third less liquid firms are considered. The increase of the number of shares outstanding, contemporarily to the adoption of an international accounting standard, negatively impacts the measure of the trading liquidity especially if the volume turnover is used as proxy. Controlling for this effect, analysis results confirm the hypothesis.

JEL classification: G14, G19
Keywords: Trading liquidity, Information asymmetry, Accounting standards, Cost of Capital.

2.2. Introduction

Finance and accounting theory has largely studied the relation between trading liquidity and level of information through the paradigm that an increase in the level of information between firms and investors should increase the trading activity.

The trading activity has been linked to the degree of the information asymmetry in several theoretical models [e.g., Glosten and Milgron (1985), Karpoff (1986)] following the paradigm that an increase in asymmetric information leads to a lower volume of trades because uninformed investors reduce their trades in less transparent securities. Therefore, an increase of the quantitative level of the information disclosed should follow an increase of the trading activity's level due to an increase of the investor's confidence to ask for securities that become more transparent. One way[41] to increase the level of disclosure could be the adoption of an international accounting standard.

In this work I want to investigate if there is a definite relation between the choice of an international accounting standard and an increase in the trading liquidity for a sample of Swiss listed firms. This goal comes out from the gap in the literature on the Swiss evidence and from an unclear result of the previous chapter. In fact, analyzing the relation between adoption of an international accounting standard and cost of capital following the models proposed by Leuz and Verecchia (2000), a significant cross relation between the adoption of an international accounting strategy and the increase in firm's trading liquidity for a sample of Swiss listed firms was not found.

The approaches used are the time series tests of the means and medians of the volume turnover, share volume and of an adjusted measure of the volume turnover; and the time series regressions and the cross sectional analysis of the percentage variation in volume turnover and in share volume. Results of the time series tests and of the time series regressions report a significant increase in the trading activity after the event of switching from a local to an international accounting standard, while results of the cross sectional regressions show that the magnitude of the increase is higher for the small firms. The magnitude of the median increase of the time series share volume's means is

[41] Several studies showed that accounting quality is determined primarily by market forces and institutional factors, rather than accounting standards (e.g., Ball et al., 2000; Leuz, 2003).

about 10% for all samples, while the magnitude of the increase doubles if only the third less liquid firms are considered. Moreover, results show that the measure with the volume turnover proxy couldn't be accurate due to a denominator effect that artificially generates variation in the measure of the trading activity. Controlling the analysis for this effect, results remain in line with the previous.

The remainder of the paper is organized as follows. Section two reviews prior research on the topic. Motivations, Hypothesis and Research design are presented in section three. Section four provides sample selection and descriptive statistics and section five describes the trading volume variables used. Section six and seven present time series analysis while in section eight the cross sectional analysis is reported. Conclusions and suggestions for future research appear in the final section.

2.3 Review of the literature

Several theoretical models have linked the trading volume to the levels of asymmetric information. One of the first tentative theories on trading in market with asymmetric information was the model proposed by Morse (1980) in which he argues that trading is an effect of the asymmetric information. The successive analytical studies by Kyle (1985), Glosten and Milgron (1985), Merton (1987) and Diamond and Verecchia (1991) reveal the intuition of the existence of a well established relationship between trading volume reactions and different levels of information among investors. When more information on a security is available, the investors' confidence to ask for them increases, so determining a consequential increase in trading volume. Generally, they argue that trading volume reactions are inversely proportional to the degree of asymmetric information. Kyle (1985), in his dynamic model of insider trading, argues that a consequence of the existence of asymmetric information is a reduction of the market liquidity that arises from the reluctance of informed investors to hold non transparent securities. Glosten and Milgron (1985) analyze the bid-ask spread as a function of the presence of imperfect information between investors. They propose a formal model in which the market liquidity is expressed as an inverse function of the adverse selection and their results show the existence of a reduction of the informative asymmetry as a benefit of the increase in dis-

closure. Merton (1987) in his model of capital market equilibrium argues that trading by uninformed investors is decreasing in the level of information asymmetry. Diamond and Verecchia (1991) in their model on liquidity argue that the expected trading volume is an increasing function of the precision of the information, hence the higher the precision of information, the lower the asymmetric information level among investors. Furthermore their analysis shows that firms that reveal public information to reduce information asymmetry can increase the liquidity of its securities and so reduce the firm's cost of capital.

The intuition in these models is recurrent in more recently models like the one proposed by Kim and Verecchia (2001); a model in which firm's returns depend on trading volume in the cases where the firm defers disclosure, and argues that firms committing to more disclosure should experience a reduction in the slope coefficient of trading volume.

From an empirical point of view, several studies have tried to verify these theoretical predictions and generally results are in line with the theoretical predictions. Moreover the empirical research can be divided into two distinct areas: those that have directly studied the relation between trading reaction and level of information and those that, studying other relations, have found evidence of association between trading volume and different levels of information.

Among them that belong to the first research area are Leuz and Verecchia (2000), Bartov and Bodnar (1996) and Welker (1995). Leuz and Verecchia (2000) have analyzed for German companies the impact on the cost of capital from the commitment to give more information, measuring the asymmetric component of the cost of capital through the measure of the bid ask spread, of the market liquidity, and of the price return volatility. The commitment to give more information is proxied by the decision to adopt an international accounting standard. The results are in line with the theoretical predictions and show significant relationships. They especially show the existence of a direct association with the market liquidity and an inverse association with the bid-ask spread from an increase in disclosure levels, while they do not find a significant association with the price return volatility. Bartov and Bodnar (1996), exploring the relevance of information asymmetries in order to explain accounting policy, show that firms can in-

crease the market liquidity as a consequence of a reduction of the informative asymmetry through the adoption of more informative accounting methods. Welker (1995) analyzes for a sample of firms listed on the NYSE the relation between information level and market liquidity through the variation of the bid ask spread. This variable is used as proxy for the market liquidity according to the paradigm that a reduction of the bid ask spread indicates an increase in the market liquidity as a consequence of a higher demand of securities that become more transparent after the increase of the information level. Results show that the trading liquidity is higher for companies with a low information index in respect to those with a higher one, therefore in line with the theoretical prediction that says an increase of the information level increases the market liquidity, reducing the spreads between ask and bid. They observe that spreads decrease; hence the trading liquidity increases more rapidly for companies with a low initial information level.

Among them that belong to the second research area are Bamber (1986), Bessembinder et al (1996), Lang and Lundholm (1996, 1999), Alford and Jones (1998), Healy, Hutton and Palepu (1999), Bailey at al. (2006). Bamber (1986) studying the volume reactions to earnings announcements finds an inverse relationship between firm size and trading volume. If the firm size can be used as proxy for degree of information asymmetry[42] the consequence is of an inverse relation between trading volume and different levels of information among investors. Bessembinder et al (1996) show that the trading volume is a useful tool to proxy for the information flows. In their study, they report results of a positive reaction of the trading volume to the specific information for all the firms, while the common information seems to have a positive impact only on the trading volume of the large firms. Lang and Lundholm (1996, 1999) find that for firms that give more information a higher analyst following[43] can be observed, as well as less dispersion of the analyst's forecasts, less volatility of the revision of the result's forecasts, and a positive impact on the price of new shares issues[44]. Alford and Jones (1998) in their analysis that compares information asymmetry for three samples of Nasdaq NMS companies that trade in different home markets, find a negative relation between

[42] Several authors argue that the firm size is inversely related with the degree of asymmetric information. See, for example, Atiase (1980) Merton (1987) and Bamber (1987).
[43] The number of analysts following is often used as proxy for the asymmetric information.
[44] In their study there is evidence that the management voluntarily increases the amount of information to the investor in correspondence of the emission of new shares for being able to obtain a higher issue price.

share turnover and adverse selection component of the spread bid ask that is used as proxy of asymmetric information. Healy, Hutton and Palepu (1999), studying whether firms benefit from expanded voluntary disclosure examining change in market factors, show that an increase of the disclosure level is followed by an increase of the stock liquidity, of the firm's performance, of the institutional ownership and of the analysts following. Bailey at al. (2006) examine the consequence of the increase in disclosure that non-U.S. firms experience when listing shares in the U.S.. They find empirical evidence of a general increase in trading volume after listing shares in U.S., and they argue that among the possible reasons, the increase is also due to a reduction of the asymmetric information among investors.

Recently, the literature focusing on the relation between trading volume and return comovements has shown evidence of a persistent inverse relation between degree of asymmetric information and trading volume. Llorente et all. (2002) propose and test empirically a model which predicts that the relation between trading volume and return autocorrelation is related to the degree of information asymmetry, and Gagnon and Karolyi (2006) report evidence that stocks characterized by different degree of information asymmetry tend to experience high volume. Finally, a series of studies on emerging markets report empirical evidence of an increase in trading volume as consequence of adopting more informative accounting rules.

2.3 Motivations, Hypothesis and research design.

Economic theory suggests the existence of a well defined relationship between asymmetric information and trading liquidity according to which a reduction of the information asymmetry is reflected positively on the trading activity for one listed company. Adopting an international accounting standard, and by doing so deciding to increase the quantitative level of disclosure, leads to a higher transparency on the economic and financial firm's situation. An increase of the firm's transparency is followed by an increase in the investors' confidence[45] to ask for a firm's shares, thereby increasing the trading volumes. Moreover, the increase in trading activity should be relatively

[45] Mainly for informed investors.

higher for the small firms, considering that these start from a higher level of asymmetric information. In fact, small firms have a higher level of asymmetric information than the larger firms due to the limitation of their numbers and sources of information[46]. It follows that the standardization of the level of disclosure through the adoption of an international accounting standard should have more effect on the firms with higher information asymmetries, hence with the small firms.

The theoretical argumentations described and the evidence of the previous research suggests the formulation of two hypotheses on the consequences coming from the choice to adopt an international accounting standard:

HYPOTHESIS 1: *firms that adopt an international accounting standard benefit from an increase in the trading liquidity.*

HYPOTHESIS 2: *the magnitude of the increase in trading liquidity that comes from an adoption of an international accounting standard is positively associated with the degree of asymmetric information. It follows that the magnitude of the increase is relatively higher for the small firms.*

Time series statistical tests and time series regression are used to test the first hypothesis, while cross sectional analysis is used to test the second one, using the shares volume and the volume turnover as proxies for trading activity. The volume turnover is indicate in literature as the canonical tool[47] for measure the trading volume, but it could be inappropriate in this case due to a *denominator effect* that reduces artificially the measure of the trading liquidity of a firm when the total number of shares outstanding is increased. To verify this and to test the formulated hypothesis I first use an adjusted version of the volume turnover ratio as ulterior proxies for trading liquidity and then estimate regressive models controlled by the firms that have not changed the number of shares outstanding in the before and after event period.

In the time series analysis I first test differences between the time series mean and median of trading liquidity proxies on two windows of 52 weeks before and after the

[46] The tendency of the media is to report more news on large firms.
[47] See Lo and Wang (2000).

event of adoption of an international accounting standard and second, estimate two time series firms effect models that relate the level of the share volume and of the volume turnover between the before and the after event windows. In the cross sectional analysis, I estimate two regressive models that relate the percentage variation of the average trading liquidity proxy with firms' characteristics like the size and the liquidity level. Regressive models are built considering the evidence of the recent literature on the determined of the cross sectional variation of the trading volume, especially the theoretical and empirical evidence reported by Lo and Wang (2000).

2.4 Sample selection and descriptive statistics.

The sample selection begins from the 399 Swiss firms included in a predefined stocks list of the Worldscope database called "WSCOPESW.LLT". That list contains all the firms that were and are traded in Switzerland. For each firm I have verified if and when they have changed their accounting standard from a local to an international one. From 1987 to 2004 I have individuated 117 firms that have adopted for the first time an international accounting strategy. Among these, 8 have successively returned back to a local accounting strategy and 16 are financial firms. The latter are excluded from the sample because they are characterized by different accounting rules and also because their financial reporting differs from that of the non-financial firms; while for those that have changed their accounting standard more than one time I consider only the first change.

A successive selection is necessary due to the data availability. Firms that have at least two years of observations before the event and two years after the event are included in the sample. This sample inclusion criteria avoids including firms that were listed or delisted in the year prior to the before event window and in the year following the after event window, respectively. Following this inclusion criteria, 37 other firms either for having no data or for insufficient number of observations are excluded, reducing the final sample to 64 non-financial firms. Panel A of Table 2.1 reassumes the procedure of selection process and panel B shows the distribution of the event of adoption of an international accounting standard among years.

The statistic description of the sample is reported in table 2.2. At the fiscal year end before the adoption of an international accounting standard the average (median) size of the market value of the sample is of 1.17 (0.241) billion of CHF, with the larger firm that capitalizes 17,143 billion while the smaller 4,92 million. The average (median) volume turnover, that is calculated as the average of daily volume turnovers during the last fiscal year before the switch, is 4.7% (0.32%), with the highest being 96.96%, the second highest 52.07% and the smallest 0.00372%. The percentiles statistics reveal that 90% of the firm's samples have an average volume turnover during the last fiscal year before the switch lower than the 10%, showing so presence of segmentation by volume turnover. In fact, the 64% of the sample firms have a turnover ratio lower than 1%, the 26% have a turnover ratio between 1 and 10% and the remaining 10% have a turnover ratio higher than 10%. The average (median) share volume, that is calculated as the average of the daily shares traded during the last fiscal year before the switch, is 60.21 (3.3) thousand shares, with the highest at 2503.56, the second highest at 283.23 and the smallest at 0.055 thousand shares.

2.5 Trading volume variables

As measure of trading volume I use three proxies: share volume, volume turnover and adjusted volume turnover.

Share volume SV is defined as the daily number of shares traded, representing thereby a firm's specific measure of the trading liquidity.

a) $$shares\ volume = \#\ of\ \ shares\ traded \tag{2.1}$$

Volume turnover VT is defined as the ratio to the shares volume of the number of shares outstanding, representing a firm relative measure of the trading activity.

b) $$volume\ \ turnover = \frac{\#\ of\ \ shares\ \ traded}{\#\ of\ \ shares\ outstanding} \tag{2.2}$$

Adjusted volume turnover Adj-VT is defined as the ratio to the shares volume of the average of the number of shares outstanding in the analysis period, representing an adjusted firm relative measure of the trading activity. The motivation to take the average of the number of shares outstanding is given by the possibly negative impact on the volume turnover ratio by the change in the number of shares outstanding. In fact, a variation in the number of shares outstanding could imply an exogenous variation in the turnover ratio as consequence of a variation of the denominator of the ratio.

c) $$Adj-volume\ turnover = \frac{\#\ of\ \ shares\ \ traded}{Average\ of\ \ the\ \ \#\ of\ \ shares\ outstanding} \qquad (2.3)$$

2.6 Univariate Statistics

In this section, I analyze cross-sectional differences in firm level trading liquidity between the before and the after period of the firm's switch from a local to an international accounting standard. I analyze average and median measures of trading liquidity presenting t-statistics to test the null hypothesis that the measures are the same between the two event periods.

Results show as expected a significant increase in the trading volume after the adoption of an international accounting standard for a sample of 64 Swiss firms. This result is obtained generalizing the evidence of the time series analysis of the share volume and of the adj-volume turnover, while the analysis of the volume turnover does not show results in line with the hypothesis due to a decrease of the ratio given by the increase of the number of shares outstanding. I use a weekly horizon as the best compromise between the necessities of minimizing the volume fluctuation and maximizing the sample size, so all data are computed as the weekly average of the daily observations. All the proxies show same results for the less liquid firms while seemingly contrasting results for the higher liquid firms.

2.6.1 Share Volume.

The Share Volume SV is calculated for each firm as the weekly average of the daily numbers of share changed of the total daily number of shares outstanding on two windows of 52 weeks before and after the event of adoption of an international accounting standard. It is a direct measure of the firm trading volume and is measured in unit of thousands.

Table 2.3 shows mean and median cross sectional results of the time series means and medians of the share volume. The time series of the SV's means increases after the event in mean from 61'200 to 68'472 and in median from 58'710 to 63'030 shares. That means an increase of 11.9% and 7.4% in mean and in median, respectively. Moreover the difference in mean and in median between the before and the after event windows are statistically significant at level higher the 95% and the 90%, respectively.

The time series of the SV's medians increases in mean from 2141 to 2529, and in median from 2090 to 2530 shares. That means an increase of 18.1% and 21.1% percent in mean and in median, respectively. Moreover, the differences in mean and in median between the two events windows are both statistically significant at a level higher than 99%.

The percentiles analysis shows that the magnitude of the increase seems to be higher for small variations of SV, especially for the time series of the median. That suggests the possibility that magnitude of the variation could be different for different level of liquidity. To verify this, I break the sample in three sub-samples in function of the trading liquidity level. Results, reported in panel A of table 2.6, show that for all the terciles there is an increase in the number of share traded after the event. For the more liquid firms' tercile, even the difference in mean and in median between the before and the after event time series SV's means are not significant, the magnitude of the increase is of 9.2% and 4.9% in mean and in median respectively, again a statistically significant increase for the less liquid firms tercile of 41.9% and 42.4% in mean and in median respectively. The time series of the SV's medians show a more contained increase for the less liquid firms' tercile of 22.4% and 20% against the 10.1% and 10.5% increase in mean and in median respectively of the more liquid firms' tercile. Hence, the analysis of

the sub-samples shows that the magnitude of the increase in the share volume is relatively higher for the less liquid firms.

In conclusion, the analysis of the share volume confirms an increase of the number of shares traded after the adoption of an international accounting standard for a sample of 64 Swiss firms. Moreover, this analysis suggests that the magnitude of the increase is an inverse function of the trading liquidity level, a relation that will be investigated in the cross sectional analysis.

2.6.2 Volume Turnover

The Volume turnover ratio VT is calculated for each firm as the weekly average of the ratio of the daily number of shares changed to the total daily number of shares outstanding on two windows of 52 weeks before and after the event of adoption of an international accounting standard.

Table 2.4 shows mean and median cross sectional results of the time series means and medians of the volume turnover ratio. Results show, against the expectations, a reduction of turnover ratio after the event. However, while there is a significant reduction both in mean and in average of the time series of the share turnover mean, the time series of the median share turnover decreases insignificantly both in mean and median in the after event windows. The time series of VT's means shows a decrease of the trading volume in the after event window of 26.7% and of 25.4% in mean and median respectively, and these decreases are both statistically significant at a level higher than 99 percent. Instead, the time series of the VT's medians shows an insignificant decrease in the trading volume of 2.7% and of 3.4% in mean and in median respectively.

Moreover, the high differences between the mean and median values of the two time series suggest that higher negative values of share turnover characterize the time series of mean. To verify this, as for the share volume proxy, I break the sample in three sub-samples in function of the trading liquidity level. Results reported in panel B of table 2.6 show that for the tercile less liquid results there is a significant increase in the

trading volume after the event, while for the middle and for the more liquid tercile there is a significant decrease in trading liquidity in the after window event.

These results seem to confirm for the VT ratio an increase in the trading liquidity only for the firms with lower trading liquidity level, while the trading volume for the middle and more liquid firms seem to decrease after the event of adoption of an international accounting strategy. Moreover, it is noted that the nature of the different results with respect to those obtained with the share volume proxy, could depend on a denominator effect that artificially decreases the magnitude of the volume turnover ratio. The denominator effect is due to an increase of the total number of shares outstanding and in this analysis its effect is important. Panel B of table 2.2 shows that from one year before to one year after the adoption of an international accounting standard, 50% of the firm's sample increased the total numbers of share outstanding and the increase is in average of 421.5%. This increase is in line with the evidence of Ashbaugh (2001), which argues and documents that firm's tend to adopt an international accounting standard in occasion of a new equity issuing. To take in account the presence of the denominator effect, the analysis on the volume turnover is repeated with an adjusted version of the volume turnover ratio in which the denominator is constant and it is calculated as the average of the daily number of shares outstanding during the two event windows.

2.6.3 Adjusted Volume turnover

The adjusted volume turnover Adj-VT is calculated for each firm and for each week as the weekly average of the ratio between the daily number of shares changed to the average number of shares outstanding on two windows of 52 weeks before and after the event of adoption of an international accounting standard. The nature of this adjustment is due to the possibly negative and exogenous effect on the volume turnover ratio by the increase of the number of share outstanding. In fact, 50% of the firms' sample changes its number of shares outstanding during the analysis period. Moreover, considering the magnitude of the increase, which is in average of 421%, the negative impact on the variation of the ratio between the two event windows should not be negligible. Fur-

thermore the results obtained with the canonical volume turnover ratio are, differently from those obtained with the share volume, not in line with the theoretical evidence.

The result reported in table 2.5 show, as expected, that the Adj-VT present a similar pattern with the Share volume. The time series of the Adj-VT's means increase in the after event windows of 9.6% and of 11.3% in mean and in median respectively, but these increases are not statistically significant. Instead, more significant are the increases in mean and in median of the time series of the median Adj-VT with increases of 23.3% and of 23.5% respectively on the after event window. The analysis of the percentile does not show particular evidence, except the fact that the max variation in the time series means is negative. The analysis of the sub-sample show the different magnitude of the increase among liquid firm's terciles, confirming that the less liquid firms benefit from a higher relative increase in trading liquidity after the event of adoption of an international accounting standard.

2.6.4 Result's comments.

The results of the time series tests confirm the first hypothesis showing that there is an increase in the trading liquidity for a sample of 64 Swiss firms that have changed its accounting standard from a local to an international one. The analysis suggests that the measure must be made with appropriate tools. In fact, if it used the canonical tool of the trading activity, namely the volume turnover ratio, the evidence of an increase in the trading liquidity should be hidden by other effects like, in these cases, the increase of the denominator of the ratio that artificially determines a decrease in the measure of the trading activity. For this reason I measure the variation in trading activity using the share volume that is not directly influenced by the number of shares outstanding. The results obtained with the share volume are confirmed by those obtained using the adjusted version of the volume turnover, namely the adj-VT. The analysis evidence is of a statistically significant increase of the time series medians of the share volume and of the adjusted volume turnover ratio in the after event window. Moreover the subsample analysis shows that the less liquid firms benefit from a higher relative increase in trading li-

quidity after the event, suggesting the existence of an inverse function between the trading liquidity level and the magnitude of the increase in trading liquidity. The cross sectional analysis may show the existence of this relation.

2.7 Time series regression.

The univariate results of the previous section provide useful evidence on the increase of firms' trading liquidity level after the adoption of an international accounting strategy. In this section I present a more formal test, regressing the firm's trading liquidity level measured by the share volume and the volume turnover on the indicator variable of adoption of an international accounting standard. I run a pooled time series regression using the following firm[48] fixed[49] effect model:

$$y_{i,t} = \alpha_i + \beta * IR_{i,t} + \sum_n \gamma_n * CV_{i,t,n} + \varepsilon_{i,t} \quad (2.4)$$

where *i* indexes firms from 1 to 64, *t* indexes weeks from 52 before to 52 after the event of the switch from a local accounting standard to an international one, α_i correspond to firms' fixed effect, $IR_{i,t}$ is a set of indicator variables equal to 1 when the firm adopts an international accounting standard or 0 otherwise, and $\varepsilon_{i,t}$ is a random disturbance assumed to be possibly heteroskedastic and correlated within firms[50] (Petersen (2006)). The coefficient β indicates the deviation of y from the firm specific average before the switch from a local accounting standard to an international one; and $CV_{i,t}$ is a set of *n* control variables.

Table 2.7 reports results when the share volume is used as dependent variable. Results show a statistical significant increase (β=7.29, p-value 0.0383) in the share vol-

[48] I do not control for time effect because the panel data is composed of observations on different firms in different times. Moreover, due to the low number of observations, there are not enough degrees of freedoms for estimating the model considering the time effects.
[49] The Hausman test of the random effects specification against the fixed effects specification rejects the random effects specification.
[50] Tests on serial correlation made with the Wooldridge (2002) procedure reject the null hypothesis of no correlation within firms.

ume after the adoption of an international accounting standard. The positive relation remains significant ($\beta = 7.64$, p-value 0.0403) after controlling for variables such as firm's price, firm's size and firm's return volatility[51]. Table 2.8 reports results when the volume turnover is used as dependent variable. The first column reports regression results when all the firms are considered, while in columns II and III the results are obtained controlling the relation for a dummy variable indicating the no-change of the number of shares outstanding during the period of analysis, eliminating any possible *denominator effect*. In fact, while results in column I report a decrease in the volume turnover ratio, results in column II and III report a significant increase of the volume turnover ratio after the switch. This analysis confirms the negative impact of the variation in the total number of shares outstanding on the increase of the volume turnover ratio.

Table 2.9 and 2.10 report regressions' results when the sample is split in three terciles based on the firm's liquidity level. The first column reports estimations' results of the cross product among each tercile and the dummy indicating the switch to an international accounting standard, while in the second and third column results are obtained controlling the cross products for the firms that have not changed their number of shares outstanding during the analysis's period. Results show in general an increase of the trading liquidity in each tercile after the switch to an international accounting standard. Especially, if the regressions are controlled by the firms that have not changed their number of shares outstanding, results report a significant increase of the trading liquidity after the event only for the first terciles when the share volume is used as dependent variable, and only for the first and third terciles when the volume turnover ratio is used as dependent variable. However, for the other terciles, even if statistically insignificant, they show almost always a positive sign. Moreover, the impact of the *denominator effect* on the VT ratio is evident. In fact, while the estimation of the full model indicates a negative relation between the dependent variable and the dummy *IR*, this relation becomes positive when the regression is controlled by the firms that have not changed their number of shares outstanding (Table 2.8). Finally, the low number of observations does not permit, due to a near singularity, estimation of the magnitude of the increase in trad-

[51] The relation still remains positively significant after adding the lagged dependent variable as an ulterior control variable.

ing liquidity for each tercile that it is hypothesized to be negatively related to the firm's size and will be investigated in the next section.
Concluding, this analysis confirm the results of the univariate analysis, showing evidence of increase of the firm's trading liquidity after the adoption of an international accounting standard, then in line with the first hypothesis.

2.7.1 Cross-Listening as possible confounding effect.

The firm's cross-listing could be a possible confounding effect. It is interesting to control the nature of the relationship between trading liquidity and adoption of an IAS for this possible effect.

Using the "Aktienführer Schweiz", a yearly finance book with information on all the Swiss firm's listed at the SWX, I have found cross-listed information on only 57 firms of the sample 64. Of these 57 firms, only 7 are cross-listed and none have themselves cross-listed during the analysis period. This characteristic does not allow the use of a firm fixed effect model. As a valid alternative, I run a pooled time series regression controlling the regression for time effects using a set of year dummy variables.

The regression results are reported in table 2.11. In the first column there are results when the Share Volume is used as proxy of the trading liquidity, and in the second and third columns, when the Volume turnover is used as proxy of the trading liquidity. There is a positive and significant association (β=6.2398, p-value 0.0881) between the share volume and the dummy IR, indicating the adoption of an international accounting strategy and the relationship result to be positive (β=0.0001, p-value 0.0000) when the VT is used as proxy for the trading liquidity only when the regression is controlled for the firms that did not change the total number of shares outstanding. These results are in line with the previous indicating once again that the trading liquidity increases significantly after the adoption of an International accounting standard.

2.8 Firm size and liquidity level.

In this section I investigate the relation between the variation in the trading volume and some specific firms characteristics like the size and the level of the trading liquidity, controlling for some variables that the literature has shown useful in explaining the cross section of turnover. The aim of this section is to test the second hypothesis, namely to test that the magnitude of the increase in trading liquidity after the switch from a local to an international accounting standard is higher for the small and the less liquid firms.

2.8.1 Determinants of trading volume

Atiase (1980) argues that firm size is positively related to the investor's incentive to acquire private pre-disclosure information, which means the quantity of pre-disclosure information should be lower for the small firm, thereby determining higher information asymmetries. Successively, Atiase (1985) reports empirical evidence consistent with his argumentations. Moreover, Bamber (1987) suggests that small firms have higher levels of asymmetric information than the large due to the limitation of their numbers and sources of information, and Merton (1987) argues that the existence of asymmetric information could explain why uninformed investors do not invest at all in certain securities such as the small firms. It follows that the standardization of the level of disclosure through the adoption of an international accounting standard should have more effect in term of trading liquidity on the firm with higher information asymmetries, hence with the small firm. Therefore, in line with these argumentations the association between the variation in trading liquidity and the firm size should be negative.

Moreover, the literature reveals that the less liquid firms are those with higher degrees of asymmetric information. An implication of the Diamond and Verecchia (1991) model, revealed by Bartov and Bodonar (1996), is that the increase in trading activity is a concave function of the precision of the information. This concavity implies that increases in liquidity are higher for more higher levels of asymmetric information. It follows that the less liquid firms should benefit from a relatively higher increase in trading activity. Gagnon and Karolyi (2006), using the stock's illiquidity and the firm size as

measure of the asymmetric information, find evidence that stocks characterized by different degree of asymmetric information tend to experience high volume trading. Therefore, in line with these argumentations, the association between the variation in trading liquidity and the firm's liquidity level should be negative.

Moreover, excess expected returns and high levels of return's volatility should increase trading volumes. In consideration of that, following Lo and Wang (2000), I add in the regression model three variables α, β and σ that are respectively the intercept, the slope and the residual standard deviation of the time series regression of each firm's stock return on the market return. The expected signs should be all positive, considering the fact that excess returns give investors an incentive to sell or buy more shares than the average, thereby increasing change volumes, while high levels of volatility should both generate more portfolio rebalancing needs and act as incentive for investors to become more active in going in and out from a shares investment. Another impact on the turnover could be represented by the trading cost, considering that higher trading cost can reduce trading liquidity. In consideration of that I add to the model, following Lo and Wang (2000) the negative covariance of the first order firm's return γ. This variable approximates the measure of the bid ask spread, as indicated in the effective bid ask spread model of Roll (1984). Moreover, I expect a positive sign for that variable. In fact, a negative value of γ implies a large bid ask spread, hence higher trading cost and, consequentially, less trading activity. The share price plays another significant role in determining the trading activity. In fact, for the same investment amount the number of shares traded is high if the price is lower.

2.8.2 Cross sectional analysis

The analysis of the correlations, reported in table 2.12, shows a negative relation between the trading volume measures and both the firm size and the liquidity level degree. However, these correlations are statistically not different from zero, probably due to the low number of observations in the sample. The analysis among the possible explanatory variable highlights a high correlation among the first order autocovariance of returns γ and the three variables α, β and σ of 0.385, 0.475 and -0.639, respectively. This suggests

possible collinearity effects if they are used together in a regression model. For this reason, γ is excluded from the set of the possible explanatory variables[52].

Results of the cross sectional analysis show the existence of a negative relation among variation in trading volume, firm's size and firm's liquidity level for a sample of 64 Swiss listed firms that have changed their accounting standard from a local to an international one.

The two models used for the cross sectional analyses are the following:

$$\Delta\%VT_i = \gamma_0 + \gamma_1 Log(MV_i) + \gamma_2 Liq_i + \gamma_3\alpha_i + \gamma_4\beta_i + \gamma_5\sigma_i + \varepsilon_i \quad (2.5)$$

$$\Delta\%SV_i = \gamma_0 + \gamma_1 Log(MV_i) + \gamma_2 Liq_i + \gamma_3\alpha_i + \gamma_4\beta_i + \gamma_5\sigma_i + \varepsilon_i \quad (2.6)$$

These are the volume turnover and the share volume models respectively[53].

The regression's results of the volume turnover model are reassumed in table 2.13. The univariate analysis results, summarized in the first two columns, show the existence of a significant negative relation between the variation in volume turnover on the one hand and the logarithm of size and liquidity level on the other hand. However, while the logarithm of size explains about 11% of the total variance, the liquidity level doesn't seem to be a powerful explanatory variable. The multivariate analysis confirms the existence of a significant negative relation among the dependent variable and the explanatory variables of the logarithm of size and the liquidity level. Furthermore, the multivariate analysis shows the existence of a significant positive relation between the variation in volume turnover and the α, while the relation with β and σ are insignificant. That suggests that the excess expected returns contribute to explain the difference in variation in volume turnover across firms, while the variables for the systematic and residual risk don't seem to contribute to explain the difference in variation in volume turnover across a sample of 64 Swiss firms. Moreover, considering the high slope of the α, it is possible that this variable captures high effects on the volume turnover making the other explanatory variables insignificant. For this reason I compute a new regression excluding the α variable. Results, reported in column VII, are similar to those in which the α variable is included,

[52] When γ is added as control variable, its coefficient results to be insignificant, decreasing the explanatory power of the models.

[53] The Price is not included in the models, however its adding is insignificant and does not change the estimations` values.

except for the sign of σ that still remains insignificant but becomes negative, and for the explanatory power of the model that decreases more than 15%. In columns V and VI, regression results are summarized excluding the size and the liquidity level variables for reason of possible multicollinearity, respectively. Results confirm once again the existence of negative relations between the dependent variable and the variables of size and liquidity level, showing an increase in the levels of significance. The last column reports coefficients estimation when all the control variables are used, showing that they do not help in increasing the explanatory power of the model, leaving unaltered the relation between the dependent variable and both the firm size and the liquidity level variable[54]. Therefore, cross regression results of the volume turnover model show the existence of a significant negative association between the variation in volume turnover on the one hand and the firm's size and the firm's liquidity level on the other hand. However, results obtained with the volume turnover model cannot eliminate the doubt that the negative relation is influenced by the *denominator effect,* namely by a variation of the firm's number of shares outstanding during the period of analysis.

Table 2.14 reassumes regression's results of the share volume model. The univariate analysis results, reassumed in the first two columns, show the existence of a significant negative relation only between the variation in share volume and the logarithm of the firm's size while insignificant is the relation with the firm's liquidity level. In the last column are reported regression results when α, β are added as control variables. The variable σ is not added[55] due to its negative correlation of 0.326 (p-value 0.009) with the logarithm of the firm's size. Results show a negative significant relation between the variation of share volume and the logarithm of the firm's size, while insignificant remains the negative association with the variable indicating the firm's liquidity level[56]. Moreover, for the share volume model too, it is possible that the variable α, considering its high slop, captures high effects on the share volume making insignificant the other explanatory variables. For this reason I compute a new regression excluding the α vari-

[54] The adding of the firm's price and of the increase in firm's return volatility, estimations of which are statistically insignificant, do not contribute to the explanatory power of the model, leaving unaltered the relation between the dependent variable and both the firm size and the liquidity level variable.
[55] If the variable σ is added in the share volume model, the relation between the dependent variable and the logarithm of firm's size becomes insignificant with a p_value of 0.5913
[56] Regression results do not change when the firm's price and the increase in firm' return volatility are added as ulterior control variables.

able. Results, reported in column VII, are similar to those in which the α variable is included, except for the explanatory power of the model that decreases more than 10%. In columns V and VI are summarized regression's results excluding the size and the liquidity level variables for reasons of possible multicollinearity, respectively. Results confirm one more time the existence of negative relations between the dependent variable and the variables of size, showing an increase in the levels of significance, while insignificant remains the relation with the liquidity level. So, cross regression results of the share volume model confirm the existence of a significant negative association between the variation in share volume and the firms' size, while not confirming the relation between the variation in share volume and the firms' liquidity level, which, although in line with the expectation, remains statistically insignificant.

The first two columns of Table 2.15 report results of the regressions controlled by the variation in the total number of shares outstanding during the period of analysis. I use a dummy variable NONOSH that is equal to 1 when the firm has not changed its number of shares outstanding from one year before to one year after the adoption of an international accounting standard, 0 otherwise. Results are in line with the previous, showing again the existence of a significant negative relation between the variation in trading liquidity and the firm's size, while the relation with the liquidity level remains insignificant. Moreover, the SV model reveals the existence of a negative (p-value 0.1067) relation with the dummy NONOSH. This relation reveals that the magnitude of the increase in SV is in average lower for the firms that have not changed their number of shares outstanding during the analysis period. The second two columns of the table 2.15 report results[57] of the cross product regressions, showing that only for the SV model there is a negative and statistically significant relation with the cross product between the logarithm of the firm size and the dummy indicating the no-change in the number of shares outstanding. This relation reveals that the variation in share volume between the before and the after event period is higher for the small firms among those that have not changed their number of shares outstanding. This result is in line with the second hypothesis confirming that the magnitude of the increase in trading liquidity is higher for

[57] Regression results do not change when control variable α is excluded.

the small firms. However, this result is not confirmed by the VT model that reports insignificant estimations.

Results obtained from the cross sectional analysis confirm the evidence of the time series analysis about the existence of a negative relation between the variation in trading liquidity and firm's size, while not all significant is the relation between the variation on trading liquidity and the firm's liquidity level, especially when regressions are controlled by the firms that have not changed their number of shares outstanding, avoiding a denominator effect. Concluding, these results confirm that for a sample of 64 Swiss firms that have adopted an international accounting standard, those with a small firm size benefit from an increase in trading liquidity more than the larger firms.

2.9 Summary and conclusions

The aim of this study is to investigate if there is a definite relation between the choosing of an international accounting standard and the increase in the trading liquidity for a sample of Swiss listed firms. This purpose comes out from the gap[58] in the literature on the Swiss evidence, and also because in the previous essay, a significant cross relation between the adoption of an international accounting strategy and the increase in firm's trading liquidity for a sample of Swiss listed firms was not found.

Theoretical evidence suggests the paradigm according to which increases of the quantitative level of firm's disclosure determine an increase in the firm's trading activity. Adopting an international accounting standard, and by doing so deciding to increase the quantitative level of disclosures, leads to a higher transparency on the economic and financial firm's situation. An increase of the firm's transparency is followed by an increase in the investors' confidence to ask for firm's shares, increasing thereby the trading volumes.

The analysis of the trading activity is made with three proxies: volume turnover, share turnover and adjusted volume turnover. The use of the adjusted volume turnover is given by the fact that the volume turnover, which is the canonical proxy for trading ac-

[58] Recently, the analysis of Daske, Hail, Leuz, and Verdi (2007) has contributed to reduce this gap, reporting evidence of an increase in market liquidity for European firms, Switzerland included, that switched to IFRS before this reporting became mandatory.

tivity, could give a wrong measure of the variation in trading activity during the event windows due to a variation of its denominator, namely a variation of the total number of shares outstanding. Therefore, in the adjusted measure, the denominator is taken as constant as the average of the total numbers of shares outstanding during the period of analysis.

The hypotheses tested in this study are two: the first one hypothesizes an increase in the trading liquidity as consequence of the switch from a local to an international accounting standard, and the second one hypothesizes that the magnitude of the increase is relatively higher for small firms. Results of the time series tests and of the time series regressions confirm the evidence of an increase in the trading liquidity for a sample of 64 Swiss firms. The analysis suggests that the measure must be made with appropriate tools. In fact, if it is used the volume turnover as proxy, the evidence of an increase in the trading liquidity should be hidden by other effect like the increase of the denominator of the ratio that artificially determines a decrease in the measure of the trading activity. The results obtained with the share volume are confirmed by those obtained using the adjusted version of the volume turnover. The analysis evidence is of a statistically significant increase of the time series medians of the share volume and of the adjusted volume turnover ratio in the after event window. The time series regressions confirm again the evidence of the time series test analysis even when regressions are controlled by a dummy variable indicating whether the firm has not changed its number of shares outstanding during the analysis period. The subsample analysis tests show that the less liquid firms benefit from a higher relative increase in trading liquidity after the event, suggesting the existence of an inverse function between the trading liquidity level and the magnitude of the increase in trading liquidity. The cross sectional analysis does not at all confirm this inverse relation. The evidence is significant for the firm's size, while it is significant for the liquidity level only when the trading liquidity is measured in terms of volume turnover. Moreover, controlling the regressions for the firms that have not changed their number of shares outstanding during the period of analysis, there is still evidence of an inverse relation between the variation in share volume and the firm size, while results of the volume turnover model are insignificant.

Concluding, these results confirm, in line with the first hypothesis, the evidence of a significant increase in the trading activity for a sample of 64 Swiss firms that have adopted an international accounting standard. Furthermore, the analysis also confirms that those firms with a small firm size benefit from an increase in trading liquidity more than the larger firms, hence in line with the second hypothesis, while not at all clear are the results on the relation between the increase in the trading liquidity and the firm's liquidity level.

One limit of this research is given by the low data availability. Of 117 Swiss firms that have switched their accounting standard from a local to an international one between 1985 and 2004, only for 64 of those is data available. Therefore, the little sample dimension is not enough for obtaining a general result. It follows that future research could be orientated to verify if the results of this study are valid in general and not only for a sample of 64 Swiss firms. Moreover, another important evidence of this study is on the validity of the volume turnover used to measure the trading liquidity. In fact, especially in an event like the change of the accounting standard, firms often decide to change the number of shares outstanding, too. This operation has a not negligible impact on the measure of the trading liquidity when the volume turnover is used as proxy. The presence of this impact can help in explaining the insignificant results relatively to the second hypothesis of the previous essay.

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2.11 Tables

TABLE 2.1: Sample Selection Procedures

Panel A: Sample selection	*Number*	*Percent*
Firms that have adopted an International accounting standard	117	100
Financial firms	16	13.7
Firms excluded	37	32.5
Total sample firms	64	53.8

The sample is composed by firms that were and are included in the SPI Swiss Performance Index from 1985 to 2004 and for which it was possible spot the change of the accounting standard from a local to an international one. Financial firms are firms that belong to the sectors of bank, insurance and asset management. For firms excluded are considered firms for which is not available a daily time series of the numbers of shares traded (35) and firms that do not have more than one year of life before the adoption (2)

Panel B: Number of switch by year

Year	*Number*	*Year*	*Number*
1989	1	1996	2
1990	3	1998	2
1991	4	1999	4
1992	14	2000	3
1993	9	2001	4
1994	5	2002	7
1995	2	2003	4

For each year it is reported the number of firms that have changed their accounting standard from a local to an international one. Only the 64 firms included in the analysis sample are considered.

TABLE 2.2: Descriptive Statistics

Panel A reports descriptive statistics of the firm's sample. MV is the firm's Market Value in millions of Swiss francs and is observed at fiscal year end before the adoption of an international accounting standard, VT is the yearly average of the firm's daily volume turnover ratio (number of shares changed divided by total number of outstanding shares) and SV is the yearly average of the firm's daily number of shares traded express in thousand. VT and SV are observed during the last fiscal year before the adoption of an international accounting standard. Panel B reports descriptive statistics on the variation in the number of shares outstanding NOSH from one year before to one year after the adoption of an international accounting standard. NOSH is a dummy with value 1 when the firm has changed its number of shares outstanding, 0 otherwise.

Panel A: Firm Characteristics

Variable	MV	VT	SV
Mean	1169.72	0.047	60'205.9
Median	240.38	0.003	3'303.9
Std. dev.	2540.90	0.144	314'388.6
Skewness	4.51	4.93	7.51
Percentiles:			
Min	4.92	3.7E-05	55.1
10%	41.61	3.8E-04	121.2
20%	71.80	8.6E-04	452.9
30%	111.05	1.6E-03	699.4
40%	168.35	2.7E-03	1'395.6
50%	240.38	3.2E-03	3'303.9
60%	423.75	5.8E-03	4'967.7
70%	834.60	1.4E-02	10'803.2
80%	1535.69	2.9E-02	31'931.8
90%	2624.09	9.4E-02	55'447.0
Max	17143.01	9.7E-01	2'503'575.4
Obs.	64	64	64

Panel B: Variation in number of shares outstanding NOSH

Firms		*Δ NOSH (000)*			
	#	*Mean*	*Median*	*Min*	*Max*
All	64	2801,75	0	-16	122970
	100%	210.75%	0%	-11.5%	2200%
NOSH=1	32	5603.5	135	-16	122970
	50%	421.5%	35.3%	-11.5%	2200%

TABLE 2.3: Share Volume

Cross sectional statistics of the time series means and medians of the SV.
Share volume SV is defined as the daily number of shares traded. The time series of the share volume is the time series of the weekly average of the daily share volume for each firm on two windows of 52 weeks before and after the event of switch from a local to an international accounting standard. The time series mean of SV is the equally–weighted average of the time series of the share volume of each firm. The time series median of SV is the median observation of time series of the share volume of each firm. The columns labelled "Δ" report the percentage variation between the before and the after event window of the time series mean and median of the share volume. * (†), **(††) and *** (†††) indicate that the test of differences in mean (the test that the relative measure is different from zero) or in median are (is) statistically significant at a level of 99, 95 and 90 percent, respectively. Obs. indicates the number of weekly average volume turnover used for each firm. SV is expressed in unit of thousands.

Cross sectional statistics of the time series means and medians of the SV.

Variable	*Time series Mean of SV*			*Time serie Median of SV*		
Statistic	Before	After	Δ	Before	After	Δ
Mean	61.20†	68.47†	11.9%**	2.141†	2.529†	18.1%*
Median	58.71†	63.03†	7.4%***	2.090†	2.530†	21.1%*
Std. dev.	15.9706	19.7681		0.59303	0.46711	
Skewness	0.4528	1.4630		0.61488	0.44474	
# firms	64	64		64	64	
Percentiles:						
Min	32.56	40.65	24.9%	1.27	1.62	27.6%
5%	39.84	46.88	17.7%	1.32	1.71	29.9%
10%	42.95	48.95	14.0%	1.40	1.90	35.3%
25%	48.82	54.76	12.2%	1.74	2.28	31.1%
50%	58.71	63.03	7.4%	2.09	2.53	21.1%
75%	73.65	76.37	3.7%	2.46	2.73	10.8%
90%	82.75	92.50	11.8%	2.95	3.09	4.5%
95%	93.68	107.63	14.9%	3.26	3.25	-0.3%
Max	96.82	138.20	42.7%	3.75	4.06	8.3%
Obs.	52	52		52	52	

TABLE 2.4: Volume Turnover.

Cross sectional statistics of the time series means and medians of the VT.
Volume turnover VT is defined as the average of the ratio of the daily number of shares changed to the daily total number of shares outstanding. The time series of the volume turnover is the time series of the weekly average of the ratio to the daily number of share changed of the daily total number of shares outstanding for each firm on two windows of 52 weeks before and after the event of switch from a local to an international accounting standard. The time series mean of VT is the equally–weighted average of the time series volume turnover of each firm. The time series median of VT is the median observation of the time series of the volume turnover of each firm. The columns labelled "Δ" report the percentage variation between the before and the after event window of the time series mean and median of the volume turnover. * (†), **(††) and *** (†††) indicate that the test of differences in mean (the test that the relative measure is different from zero) or in median are (is) statistically significant at a level of 99, 95 and 90 percent, respectively. Obs. indicates the number of weekly average volume turnover used for each firm.

Cross sectional statistics of the time series means and medians of the VT.

Variable	*Time series Mean of VT*			*Time series Median of VT*		
Statistic	Before	After	Δ	Before	After	Δ
Mean	0.0469†	0.0343†	-26.7%*	0.00254†	0.00247†	-2.7%
Median	0.0426†	0.0318†	-25.4%*	0.00239†	0.00231†	-3.4%
Std. dev.	0.0176	0.0126		0.0007	0.0006	
Skewness	0.5925	1.3099		1.2189	0.4458	
# firms	64	64		64	64	
Percentiles:						
Min	0.0206	0.0155	-24.6%	0.00153	0.00157	2.4%
5%	0.0226	0.0186	-17.9%	0.00167	0.00172	2.6%
10%	0.0275	0.0209	-24.1%	0.00185	0.00186	0.7%
25%	0.0325	0.0269	-17.3%	0.00213	0.00204	-4.3%
50%	0.0426	0.0318	-25.4%	0.00239	0.00231	-3.4%
75%	0.0576	0.0382	-33.7%	0.00288	0.00297	3.4%
90%	0.0774	0.0566	-26.9%	0.00334	0.00329	-1.7%
95%	0.0798	0.0575	-27.9%	0.00339	0.00344	1.5%
Max	0.0850	0.0726	-14.6%	0.00463	0.00367	-20.8%
Obs.	52	52		52	52	

TABLE 2.5: Adjusted Volume Turnover

Cross sectional statistics of the time series means and medians of the Adj-VT.
Adjusted volume turnover Adj-VT is defined as the ratio of the daily number of shares changed to the average number of shares outstanding from 52 weeks before to 52 week after the adoption of an international accounting standard. The time series of the adjusted volume turnover is the time series of the weekly average of daily adjusted volume turnover for each firm on two windows of 52 weeks before and after the event of switch from a local to an international accounting standard. The time series mean of Adj-VT is the equally–weighted average of the time series of the adjusted volume turnover of each firm. The time series median of Adj-VT is the median observation of the time series of the adjusted volume turnover of each firm. The columns labelled "Δ" report the percentage variation between the before and the after event window of the time series mean and median of the adjusted volume turnover. * (†), **(††) and *** (†††) indicate that the test of differences in mean (the test that the relative measure is different from zero) or in median are (is) statistically significant at a level of 99, 95 and 90 percent, respectively. Obs. indicates the number of weekly average volume turnover used for each firm.

Cross sectional statistics of the time series means and medians of the Adj-VT

Variable	*Time series Mean of Adj-VT*			*Time series Median of Adj-VT*		
Statistic	Before	After	Δ	Before	After	Δ
Mean	0.0321†	0.0352†	9.6%	0.0021†	0.0026†	23.3%*
Median	0.0294†	0.0327†	11.3%	0.0021†	0.0026†	23.5%*
Std. dev.	0.0120	0.0124		0.0004	0.0004	
Skewness	1.8082	1.2630		0.6059	0.3883	
# firms	64	64		64	64	
Percentiles:						
Min	0.016	0.017	5.4%	0.0014	0.0019	27.8%
5%	0.019	0.020	8.4%	0.0015	0.0020	33.1%
10%	0.021	0.022	4.6%	0.0017	0.0021	23.9%
25%	0.024	0.027	13.4%	0.0018	0.0023	27.7%
50%	0.029	0.033	11.3%	0.0021	0.0026	23.5%
75%	0.037	0.039	3.8%	0.0024	0.0029	23.3%
90%	0.047	0.058	22.5%	0.0027	0.0032	19.2%
95%	0.055	0.060	8.2%	0.0028	0.0035	25.5%
Max	0.083	0.072	-13.1%	0.0033	0.0035	6.3%
Obs.	52	52		52	52	

TABLE 2.6: Cross Sectional statistics across terciles

Panel A reports the cross sectional statistics of the time series means and medians of the share volume across terciles. Share volume SV is defined as the daily number of shares traded. The time series of the share volume is the time series of the weekly average of the daily share volume for each firm on two windows of 52 weeks before and after the event of switch from a local to an international accounting standard. Panel B reports the cross sectional statistics of the time series means and medians of the volume turnover across terciles. Volume turnover VT is defined as the average of the ratio to the daily number of shares changed of the daily total number of shares outstanding. The time series of the volume turnover is the time series of the weekly average of the ratio of the daily number of shares changed to the daily total number of shares outstanding for each firm on two windows of 52 weeks before and after the event of switching from a local to an international accounting standard. Panel C reports the cross sectional statistics of the time series means and medians of the adjusted volume turnover across terciles. Adjusted volume turnover Adj-VT is defined as the average of the ratio of the daily number of shares changed to the average number of shares outstanding from 52 weeks before to 52 weeks after the adoption of an international accounting standard. The time series of the adjusted volume turnover is the time series of the weekly average of the ratio of the daily number of share changed to the average number of shares outstanding for each firm on two windows of 52 weeks before and after the event of switch from a local to an international accounting standard. The first tercile is composed of the 21 more liquid firms of the sample, the second of the 21 second liquid and the last of the 22 less liquid firms. The columns labelled "Δ" report the percentage variation between the before and the after event window of the time series means and medians of the relative proxy used. P-value of the test of difference in mean and in median are reported in the column labelled "P-Value". * and ** indicate significance at 1% and 5% respectively of the t-test on the hypothesis that the relative measures are zero.

Panel A: Statistics of the time series means and medians of the SV across terciles.

		Mean SV				*Median SV*			
Liquidity level		Before	After	Δ	P-Value	Before	After	Δ	P-Value
1/3 more liquid	Mean	179.54*	196.05*	9.2%	0.1163	28.098*	30.928*	10.1%	0.0722
	Median	170.63*	178.95*	4.9%	0.1732	26.868*	29.700*	10.5%	0.1098
	# firms	21	21			21	21		
1/3 between	Mean	3.380*	4.774*	41.3%	0.0000	2.125*	2.534*	19.2%	0.0016
	Median	3.118*	4.218*	35.3%	0.0000	2.013*	2.500*	24.2%	0.0018
	# firms	21	21			21	21		
1/3 less liquid	Mean	0.360*	0.511*	41.9%	0.0000	0.175*	0.214*	22.4%	0.0034
	Median	0.320*	0.455*	42.4%	0.0000	0.167*	0.200*	20.0%	0.0041
	# firms	22	22			22	22		

Panel B: Statistics of the time series means and medians of the VT across terciles.

		Mean VT				*Median VT*			
Liquidity level		Before	After	Δ	P-Value	Before	After	Δ	P-Value
1/3 more liquid	Mean	13.83%*	9.75%*	-29.50%	0.0000	3.32%*	2.47%*	-25.6%	0.0002
	Median	12.31%*	9.01%*	-26.83%	0.0000	3.14%*	2.42%*	-22.9%	0.0003
	# firms	21	21			21	21		
1/3 between	Mean	0.45%*	0.35%*	-23.96%	0.0001	0.261%*	0.202%*	-22.5%	0.0000
	Median	0.44%*	0.32%*	-26.53%	0.0001	0.241%*	0.200%*	-17.2%	0.0000
	# firms	21	21			21	21		
1/3 less liquid	Mean	0.08%*	0.13%*	55.21%	0.0000	0.044%*	0.052%*	19.6%	0.0057
	Median	0.07%*	0.12%*	57.45%	0.0000	0.043%*	0.050%*	17.1%	0.0186
	# firms	22	22			22	22		

TABLE 6: Continued

Panel C: Statistics of the time series means and medians of the Adj-VT across terciles.

Liquidity level		*Mean Adj-VT*				*MedianAdj-VT*			
		Before	After	Δ%	P-Value	Before	After	Δ%	P-Value
1/3 more liquid	Mean	9.41%*	9.99%*	6.1%	0.4247	2.08%*	2.27%*	8.9%	0.2689
	Median	8.51%*	9.28%*	9.1%	0.2432	1.92%*	1.93%*	0.2%	0.4449
	# firms	21	21			21	21		
1/3 between	Mean	0.322%*	0.353%*	9.6%	0.1429	0.21%*	0.21%*	-2.1%	0.6426
	Median	0.302%*	0.330%*	9.1%	0.1499	0.22%*	0.21%*	-4.3%	0.5262
	# firms	21	21			21	21		
1/3 less liquid	Mean	0.074%*	0.134%*	80.9%	0.0000	0.039%*	0.053%*	33.8%	0.0000
	Median	0.069%*	0.115%*	67.4%	0.0000	0.037%*	0.050%*	35.0%	0.0001
	# firms	22	22			22	22		

TABLE 2.7: Share Volume Time Series Regression
Pooled OLS White heteroskedasticy consistence results

Firms fixed effect regression Model		
Variable	*I*	*II*
CONSTANT	61.17 (0.0000)	45.45 (0.0000)
IR	7.29 (0.0382)	7.64 (0.0277)
PRICE	-	0.0122 (0.0147)
SIZE	-	-0.0001 (0.1735)
VOLATILITY	-	893.63 (0.0002)
R squared	0.8439	0.8459
Adj. R squared	0.8423	0.8443
Prob (F-statistic)	0.0000	0.0000
Number of firm-weeks	6393	6393
Number of firms	64	64

The table presents coefficient estimates of firm fixed effects regressions of share volume SV on the adoption of an international accounting standard. The dependent variable is the weekly average of the daily share volume (daily number of shares changed) observed from 52 weeks before to 52 weeks after the switch from a local to an international accounting standard. IR is a dummy variable indicating whether the firm adopts an international accounting. The control variables PRICE and SIZE are the weekly average of the daily firm's close price and of the daily market value; VOLATILITY is the weekly standard deviation of daily's price returns. Standard errors are clustered by firm and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.8: Volume Turnover Time Series Regression
Pooled OLS White heteroskedasticy consistence results

Firms fixed effect regression Model *Variable*	*I*	*II*	*III*
CONSTANT	0.0471 (0.0000)	0.0391 (0.0000)	0.0387 (0.0000)
IR	-0.0132 (0.0001)	-	-
IR*NONOSHD	-	0.0055 (0.0226)	0.0057 (0.0184)
PRICE	-	-	0.0001 (0.0006)
SIZE	-	-	-0.0001 (0.0000)
VOLATILITY	-	-	0.1091 (0.0098)
R squared	0.4351	0.4337	0.4338
Adj. R squared	0.4294	0.4280	0.4279
Prob (F-statistic)	0.0000	0.0000	0.0000
Number of firm-weeks	6393	6393	6393
Number of firms	64	64	64

The table presents coefficient estimates of firm fixed effects regressions of volume turnover VT on the adoption of an international accounting standard. The dependent variable is the weekly average of the daily volume turnover (daily number of shares changed divided by the total number of shares outstanding) observed from 52 weeks before to 52 weeks after the switch from a local to an international accounting standard. IR is a dummy variable indicating whether the firm adopts an international accounting standard. NONOSH is a dummy variable indicating whether the firm hasn't changed its number of shares outstanding during the analysis's period. The control variables PRICE and SIZE are the weekly average of the daily firm's close price and of the daily market value; VOLATILITY is the weekly standard deviation of daily's price returns. Standard errors are clustered by firm and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.9: Terciles' Share Volume Time Series Regression
Pooled OLS White heteroskedasticy consistence results

Firms fixed effect regression Model *Variable*	*I*	*II*	*III*
CONSTANT	61.15 (0.0000)	64.94 (0.0000)	48.31 (0.0000)
T1*IR	20.16 (0.0539)	-	-
T2*IR	1.32 (0.0000)	-	-
T3*IR	0.146 (0.0000)	-	-
T1*IR*NONOSH	-	-1.93 (0.2957)	3.94 (0.0544)
T2*IR*NONOSH	-	-0.0183 (0.9499)	0.8559 (0.4001)
T3*IR*NONOSH	-	0.1474 (0.0025)	-1.26 (0.2155)
PRICE	-	-	0.0134 (0.0078)
SIZE	-	-	-0.0001 (0.1842)
VOLATILITY	-	-	896.95 (0.0002)
R squared	0.8441	0.8437	0.8458
Adj. R squared	0.8425	0.8421	0.8441
Prob (F-statistic)	0.0000	0.0000	0.0000
Number of firm-weeks	6393	6393	6348
Number of firms	64	64	64

The table presents coefficient estimates of firm fixed effects regressions of the percentage variation of the share volume SV on the adoption of an international accounting standard when the sample is split in three terciles based on the firm's liquidity level at the end of the last fiscal year with a local accounting standard. T1 is a dummy variable indicating the more liquid terciles, T2 the second more liquid and T3 is the less liquid tercile. The dependent variable is the weekly average of the daily share volume (daily number of shares changed) observed from 52 weeks before to 52 weeks after the switch from a local to an international accounting standard. IR is a dummy variable indicating whether the firm adopts an international accounting and NONOSH is a dummy variable indicating whether the firms hasn't changed its number of shares outstanding during the analysis's period. The control variables PRICE and SIZE are the weekly average of the daily firm's close price and of the daily market value; VOLATILITY is the weekly standard deviation of daily's price returns. Standard errors are clustered by firm and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.10: Terciles' Volume turnover Time Series Regression
Pooled OLS White heteroskedasticy consistence results

Firms fixed effect regression Model *Variable*	*I*	*II*	*III*
CONSTANT	0.0471 (0.0000)	0.0391 (0.0000)	0.0389 (0.0000)
T1*IR	-0.0375 (0.0000)	-	-
T2*IR	-0.0021 (0.5395)	-	-
T3*IR	0.0006 (0.0513)	-	-
T1*IR*NONOSH	-	0.0133 (0.0045)	0.0146 (0.0021)
T2*IR*NONOSH	-	0.0046 (0.4333)	0.0046 (0.4305)
T3*IR*NONOSH	-	0.0013 (0.0063)	0.0009 (0.0589)
PRICE	-	-	0.0001 (0.0816)
SIZE	-	-	-0.0001 (0.0000)
VOLATILITY	-	-	0.1143 (0.0069)
R squared	0.4337	0.4338	0.4339
Adj. R squared	0.4318	0.4279	0.4278
Prob (F-statistic)	0.0000	0.0000	0.0000
Number of firm-weeks	6393	6393	6348
Number of firms	64	64	64

The table presents coefficient estimates of firm fixed effects regressions of percentage variation in volume turnover VT on the adoption of an international accounting standard when the sample is split in three terciles based on the firm's liquidity level at the end of the last fiscal year with a local accounting standard. T1 is a dummy variable indicating the more liquid terciles, T2 the second more liquid and T3 is the less liquid tercile. The dependent variable is the weekly average of the daily volume turnover (daily number of shares changed divided by the total number of shares outstanding) observed from 52 weeks before to 52 weeks after the switch from a local to an international accounting standard. IR is a dummy variable indicating whether the firm adopts an international accounting. NONOSH is a dummy variable indicating whether the firm hasn't changed its number of shares outstanding during the analysis's period. The control variables PRICE and SIZE are the weekly average of the daily firm's close price and of the daily market value; VOLATILITY is the weekly standard deviation of daily price returns. Standard errors are clustered by firm and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.11: Cross-Listening Time Series Regression
Pooled OLS White heteroskedasticy consistence results

Pooled Time Series Regression *Variable*	*SV*	*VT*	*VT*
CONSTANT	-34.76	0.3369	0.3417
	(0.0201)	(0.0000)	(0.0000)
IR	6.2398	-0.0089	-
	(0.0881)	(0.0038)	
IR*NONOSHD	-	-	0.0001
			(0.0000)
CROSS	-13.849	0.0046	0.0066
	(0.0000)	(0.0010)	(0.0000)
SIZE	2.3619	-0.0219	-0.0225
	(0.0137)	(0.0000)	(0.0000)
VOLATILITY	-230.21	-0.3896	-0.4052
	(0.1004)	(0.0000)	(0.0000)
Year dummy	Yes	Yes	Yes
R squared	0.0918	0.1353	0.1356
Adj. R squared	0.0891	0.1326	0.1331
Prob (F-statistic)	0.0000	0.0000	0.0000
Number of firm-weeks	5675	5675	5675
Number of firms	57	57	57

The table presents coefficient estimates of the pooled time series regressions of share volume SV and volume turnover VT on the adoption of an international accounting standard. The SV is the weekly average of the daily share volume (daily number of shares changed) and VT is the weekly average of the daily volume turnover (daily number of shares changed divided by the total number of shares outstanding). SV and VT are observed from 52 weeks before to 52 weeks after the switch from a local to an international accounting standard. IR is a dummy variable indicating whether the firm adopts an international accounting standard. NONOSHD is a dummy variable indicating whether the firm has not changed its number of shares outstanding during the analysis's period. The control variables CROSS is a dummy variable indicating whether the firm is cross-listed. SIZE is the weekly average of the daily close market value; VOLATILITY is the weekly standard deviation of daily's price returns. The Year dummy indicates the presence of dummy variables controlling for yearly effects from 1989 to 2003. P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.12: Correlations

Pearson Correlation Coefficients for Firm Characteristics

Variable	MV	Δ%SV	Δ%VT	Δ%Adj-VT	PRICE	LIQ	α	B	σ	γ
Δ%SV	-0.123									
	(0.338)									
Δ%VT	-0.128	0.640								
	(0.319)	(0.000)								
Δ%Adj-VT	-0.123	1.000	0.640							
	(0.338)	(0.000)	(0.000)							
PRICE	0.112	-0.081	-0.012	-0.081						
	(0.381)	(0.527)	(0.923)	(0.527)						
LIQ	0.259	-0.073	-0.163	-0.073	-0.125					
	(0.041)	(0.568)	(0.202)	(0.568)	(0.328)					
α	-0.048	0.383	0.438	0.383	0.010	0.025				
	(0.710)	(0.002)	(0.000)	(0.002)	(0.936)	(0.846)				
β	0.312	-0.001	-0.008	-0.001	-0.111	-0.069	0.019			
	(0.013)	(0.993)	(0.950)	(0.993)	(0.386)	(0.588)	(0.885)			
σ	-0.216	0.183	0.049	0.183	-0.156	-0.047	-0.359	-0.217		
	(0.090)	(0.152)	(0.705)	(0.152)	(0.223)	(0.713)	(0.004)	(0.087)		
γ	0.029	-0.149	0.110	-0.149	0.053	-0.157	0.385	0.475	-0.639	
	(0.819)	(0.243)	(0.389)	(0.243)	(0.680)	(0.218)	(0.002)	(0.000)	(0.000)	
ΔNOSH	0.190	-0.008	-0.187	-0.008	-0.069	0.005	0.016	0.222	-0.009	0.013
	(0.137)	(0.953)	(0.142)	(0.953)	(0.590)	(0.966)	(0.900)	(0.080)	(0.945)	(0.920)

MV is the firm's Market Value observed at fiscal year end before the adoption of an international accounting standard. Δ%SV, Δ%VT and Δ%Adj-VT are respectively the percentage variations of the average time series of the weekly mean share volume, volume turnover and adjusted volume turnover between the 52 weeks before and after the event of switch from a local to an international accounting standard. LIQ indicates the firm's liquidity level and is defined in function of the volume turnover VT such as the firm with the higher VT is the most liquid. Alpha, beta and sigma are respectively the intercept, the slope and the residual standard deviation of the time series regression of each firm's stock return on the market return and gamma is the negative covariance of the first order firm's return. ΔNOSH indicate the variation of the total number of shares outstanding during the two event windows. The p-values in parentheses are for a two-tail test of statistical significance.

TABLE 2.13: Cross sectional regression: volume turnover variation.
OLS White heteroskedasticy consistence results

$$\Delta\%VT_i = \gamma_0 + \gamma_1 Log(MV_i) + \gamma_2 Liq_i + \gamma_3 \alpha_i + \gamma_4 \beta_i + \gamma_5 \sigma_i + \varepsilon_i$$

Variable	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
Constant	0.9115	0.1214	0.8991	0.7319	0.7506	0.1116	1.0188	0.4478
	(0.0164)	(0.2244)	(0.0176)	(0.0219)	(0.0206)	(0.2069)	(0.0255)	(0.2438)
Log(MV)	-0.1458	-	-0.1384	-0.1106	-0.1195	-	-0.1545	-0.0938
	(0.0109)		(0.0162)	(0.0325)	(0.0199)		(0.0148)	(0.0882)
Liq	-	-0.8312	-0.5684	-0.6724	-	-0.8876	-0.5311	-0.66542
		(0.0075)	(0.0968)	(0.0276)		(0.0003)	(0.0854)	(0.0319)
α	-	-	-	426.07	418.81	473.52	-	487.75
				(0.066)	(0.0077)	(0.0044)		(0.0047)
β	-	-	-	-	-	-	0.1054	0.1023
							(0.6063)	(0.5758)
σ	-	-	-	-	-	-	-6.629	15.15
							(0.5809)	(0.1451)
R squared	0.1236	0.0266	0.1358	0.2896	0.2727	0.2221	0.1443	0.3066
Adj. R squared	0.1092	0.0106	0.1069	0.2535	0.2484	0.1962	0.0853	0.2458
F-statistic	8.59	1.66	4.72	8.02	11.24	8.57	2.44	5.04
Prob (F-statistic)	0.0047	0.20	0.0125	0.0001	0.0000	0.0005	0.056	0.0006
No. Obs	64	64	64	64	64	64	64	64

The dependent variable is the percentage variation of the firm's average volume turnover VT between the time windows of 52 weeks before and after the event of switching from a local to an international accounting standard. VT is calculated as the weekly average of the ratio to the daily number of share changed of the daily total number of shares outstanding. Log (MV) is the natural logarithm of the firm's market value observed at fiscal year end before the adoption of an international accounting standard. The variable Liq indicates the firm's liquidity level and is defined in function of the VT such as the firm with the higher VT is the most liquid. Variables alpha, beta and sigma are respectively the intercept, the slope and the residual standard deviation of the time series regression of each firm's stock return on the market return. P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.14: Cross sectional regression: share volume variation
OLS White heteroskedasticy consistence results

$$\Delta\%SV_i = \gamma_0 + \gamma_1 Log(MV_i) + \gamma_2 Liq_i + \gamma_3 \alpha_i + \gamma_4 \beta_i + \gamma_5 \sigma_i + \varepsilon_i$$

Variable	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
Constant	1.0788	0.3544	1.1048	0.9096	0.9198	0.3661	0.1108	0.9146
	(0.0062)	(0.0098)	(0.0056)	(0.0101)	(0.0083)	(0.0030)	(0.0072)	(0.0109)
Log (MV)	-0.1311	-	-0.1299	-0.0969	-0.1018	-	-0.1388	-0.1024
	(0.0167)		(0.0197)	(0.0678)	(0.0417)		(0.0313)	(0.0541)
Liq	-	-0.4451	-0.2452	-0.3673	-	-0.5559	-0.2001	-0.3398
		(0.2169)	(0.5861)	(0.4923)		(0.2093)	(0.6263)	(0.4802)
α	-	-	-	500.45	496.48	542.04	-	497.07
				(0.0432)	(0.0391)	(0.0322)		(0.0431)
β	-	-	-	-	-	-	0.1297	0.0768
							(0.6352)	(0.8035)
R squared	0.0561	0.0049	0.0607	0.1833	0.1803	0.1533	0.0641	0.1845
Adj. R squared	0.0409	-0.0117	0.0294	0.1417	0.1531	0.1251	0.0165	0.1282
F-statistic	3.6868	0.2674	1.94	4.41	6.60	5.43	1.34	3.28
Prob (F-statistic)	0.0594	0.6071	0.1528	0.0072	0.0025	0.0067	0.2678	0.0171
No. Obs	64	64	64	64	64	64	64	64

The dependent variable is the percentage variation of the firm's average share volume SV between the time windows of 52 weeks before and after the event of switch from a local to an international accounting standard. SV is calculated as the weekly average of the daily number of shares changed. Log (MV) is the natural logarithm of the firm's market value observed at fiscal year end before the adoption of an international accounting standard. The variable Liq indicates the firm's liquidity level and is defined in function of the volume turnover VT such as the firm with the higher VT is the most liquid. Variables alpha, beta and sigma are respectively the intercept, the slope and the residual standard deviation of the time series regression of each firm's stock return on the market return. P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 2.15: Interaction Cross sectional regression
OLS White heteroskedasticy consistence results

Variable	$\%\Delta SV$	$\%\Delta VT$	$\%\Delta SV$	$\%\Delta VT$
Constant	1.1034 (0.0124)	0.3088 (0.4484)	0.8835 (0.0259)	0.4091 (0.3338)
Log(MV)	-0.0941 (0.0773)	-0.0947 (0.0763)	-0.0514 (0.4075)	-0.1094 (0.0901)
Liq	-0.7183 (0.2431)	-0.4626 (0.1708)	-0.8369 (0.1957)	-0.4665 (0.2443)
Log(MV)*NONOSH	-	-	-0.0723 (0.0619)	0.0281 (0.3321)
Liq*NONOSH	-	-	-0.7401 (0.8497)	1.1171 (0.7792)
NONOSH	-0.3995 (0.1067)	0.2036 (0.2525)	-	-
α	502.68 (0.0328)	494.51 (0.0043)	522.19 (0.0358)	482.39 (0.0086)
β	0.0305 (0.9141)	0.1301 (0.5024)	0.0081 (0.9709)	0.1368 (0.4811)
σ	-	17.39 (0.0998)	-	17.12 (0.1109)
R squared	0.2242	0.2303	0.3201	0.3241
Adj. R squared	0.1561	0.1479	0.2336	0.2517
F-statistic	3.29	2.79	3.71	4.52
Prob (F-statistic)	0.0011	0.0189	0.0023	0.0009
No. Obs	64	64	64	64

In the first and in the third columns, the dependent variable is the percentage variation of the firm's average share volume SV between the time windows of 52 weeks before and after the event of switch from a local to an international accounting standard, while in the second and in the forth columns the dependent variable is the percentage variation of the firm's average volume turnover VT. SV is the weekly average of the daily number of shares changed while the VT is calculated as the weekly average of the ratio to the daily number of shares changed of the daily total number of shares outstanding. Log(MV) is the natural logarithm of the firm's market value observed at fiscal year end before the adoption of an international accounting standard. NONOSH is a dummy variable indicating whether the firms haven't changed their number of shares outstanding during the analysis's period. The variable Liq indicates the firm's liquidity level, defined in function of the VT such as the firm with the higher VT is the most liquid, and measured at the at fiscal year end before the adoption of an international accounting standard. Variables alpha, beta and sigma are respectively the intercept, the slope and the residual standard deviation of the time series regression of each firm's stock return on the market return. P-values of the t-test that the coefficient is equal to 0 are in parentheses.

Chapter 3

Asymmetric information and firms trading volume before a scheduled announcement: The Swiss evidence.

Presented to the 31th EAA annual Congress, Rotterdam, 23-25 Apr 2008

3.1 Abstract

It is generally known that trading volume is positively related to asymmetric information amongst investors, but when there is a time discretion, the relation is likely to become negative. The aim of this paper is to empirically verify the existence of this inverse relation for a sample of Swiss listed firms. Trading volume trends are analysed before earnings announcements for a sample of 1540 events distributed across 85 firms from 1995 to 2006. I hypothesize that before an earnings announcement there is a decrease in the firm's trading liquidity due to the presence of asymmetric information amongst investors, and a positive relationship between trading volume and simultaneous changes in stock prices. Moreover, the magnitude of the price change should be higher in the case of a positive earnings release. Event analysis confirms a significant daily average decrease of about 2% in the abnormal volume turnover from 10 to 3 trading days before the announcement, while regression analysis reveals evidence that matching a lower decrease in trading liquidity there will be an upturn in the level of stock prices. Furthermore, the analysis reveals that prior to a positive announcement there will be a higher increase in the firm's share price. The analysis does not show evidence of any relationship between the decrease in trading liquidity, firm size and bid-ask spread.

JEL classification: G14
Keywords: Trading volume, Information asymmetry, Time information, Investor's behavior.

3.2 Introduction

Voluminous finance literature reports evidence of an increase in a firm's trading liquidity when asymmetric information amongst investors increases because of different investors' resources and abilities to process public information [e.g., Hakansson (1977), Kim and Verecchia (1991 and 1994), Atiase and Bamber (1994), He and Wang (1995)]. However, in the presence of events such as scheduled announcements, this relationship can be inverted [e.g. Krinsky and Lee (1996), Chae (2005), Saffi (2006)] because time discretionary investors, due to the presence of an adverse selection problem, are likely to postpone their investment when the adverse selection problem is less severe [Foster and Viswanathan (1990)]. This behaviour determines a decrease in the trading activity during the period before the announcement.

The aim of this paper is to contribute to the limited research field opened by Chae (2005) on the trading volume before scheduled announcements. Chae's analysis is concentred on specialist markets. Differently than Chae (2005), I investigate whether the decrease in trading liquidity before scheduled announcements will be evident for a stock exchange market with an open-limit order book where the adverse selection problem amongst investors should be less severe with respect to stock exchanges with market makers. In fact, the possibility to read the order book allows the investors to infer competitor's information with a consequential reduction in the asymmetric information.

In this work I want to empirically verify the existence of this inverse relation for a sample of Swiss listed firms contributing to the research field opened by Chae (2005), with his evidence on the U.S. firms. Furthermore, in this work I want to investigate the relation between the firm's trading activity and the simultaneous stock price variation around the scheduled announcement. I hypothesize the existence of a positive relationship between trading volume and the simultaneous price change before an announcement and that the magnitude of the price change should be higher in case of ex-post positive release. In fact, informed investors can be motivated to

take a position before announcements, and especially when they expect positive surprises. They can ask for shares at higher price levels, even to take a position. This follows a consequential increase in trading activity and in price levels.

Following Chae (2005), I use as scheduled announcements the earnings announcements that, as shown by Chordia, Roll and Subrahmanyan (2001), are the more appropriate proxies for scheduled announcements owing to the characteristics of release relevant specific firms' information at a predefined time that is publicly known.

The approaches used are: (i) a study of the abnormal volume turnover from 10 trading days before to 10 trading days after the scheduled announcement, (ii) a time series analysis of the abnormal volume turnover around the announcement and (iii) the time series of the cumulative abnormal volume turnover before the event. The findings of the event study report a significant average daily decrease of around 2% of the abnormal volume turnover from 10 to 3 trading days before the announcement. On the other hand, the results of the time series analysis reveal evidence that with a higher abnormal volume turnover[59] there will be a higher change in the stock price levels, and that the magnitude of the price's increase will be higher when the earnings announcements are positive. The time series analysis on the cumulative abnormal volume turnover is achieved with the goal to test if the decrease in trading liquidity is given by the presence of asymmetric information amongst investors. The analysis result does not show significant evidence of relationships between decrease in trading liquidity and either firm size or bid-ask spread.

The remainder of the paper is structured as follows. Section two reviews prior research on the topic. Motivations, hypotheses and research design are presented in section three. Section four provides sample selection and descriptive statistics. Section five presents event study analysis while section six and seven report the regression analyses. The final section is devoted to conclusions and suggestions for future research.

[59] Considering that on average the abnormal volume turnover is negative, a higher volume turnover corresponds to a lower decrease in trading volume

3.3 Review of the literature

The literature on trading liquidity around and after a scheduled announcement is voluminous, unlike the literature on trading liquidity prior to a scheduled announcement, which is very limited and, to my knowledge, completely ignores the Swiss evidence.

Glosten and Milgron (1985), in analyzing their model used to determine the adverse selection component of the bid-ask spread in an exchange market with heterogeneous expectations, predicted that spreads are large in the period before a firm's report is made public, especially if it is a small firm's report and contains considerable new information. This reveals a presence of higher adverse selection before a scheduled announcement. Adamati and Pfleiderer (1988), in modelling trading patterns in financial markets characterized both by informed investors and by discretionary liquidity investors, argued that well informed investors trade more actively in periods when liquidity trading is concentrated, and that discretionary liquidity investors, which can allocate their trades across different periods and trade for portfolio rebalancing reasons, are more likely to postpone their trading until asymmetric information is lower or resolved.

The consequence of this behaviour, which depends on the strategic interaction amongst informed and discretionary liquidity investors, determines a negative impact on the trading activity, especially before scheduled announcements in which information asymmetry is higher. Foster and Viswanathan (1990) show, in their two periods model of trading patterns in which informed investors behave strategically, that in cases of the presence of discretionary liquidity investors and of public information, there is always a higher trading cost and lower volume in the first period. This is because discretionary liquidity investors postpone their trades, avoiding to trade when the adverse selection problem is most severe. This discretionary liquidity investors' behaviour negatively impacts the trading activity by reducing volume before a scheduled announcement. Lee, Mucklow and Ready (1993) in their intraday analysis on spreads, depths and earnings information of NYSE firms, report evidence of an increase in the adverse selection risk immediately before an earnings

release. They argue that the expectation of an imminent earnings release may stimulate some investors to search for information, increasing the asymmetric information with respect to the other investors. Wang (1994), in his model of competitive stock trading with heterogeneously informed investors, argues that the behaviour of trading volume is closely linked to the heterogeneity amongst investors, especially to the different levels of information amongst uninformed and informed investors. He shows that as the information asymmetry between the two classes of investors increases, the adverse selection problem of the uninformed investors worsens and trading volume decreases. Krinsky and Lee (1996) in their study on the behaviour of the components of the bid-ask spread around earnings announcements, report evidence that the period prior to an earnings announcement is characterized by greater information asymmetry amongst market participants and thus increased adverse selection costs. Chae (2005) argues that the decrease in the trading activity before a scheduled announcement is due to the presence of severe asymmetric information between differently informed investors. In his investigation on a sample of U.S. firms, he shows that cumulative trading volume decreases inversely to information asymmetry prior to a scheduled announcement, due to the fact that uninformed investors tend not to participate in the market when it is likely to trade with an informed counterparty. Saffi (2006), in his paper focused on the impact on turnover by the dispersion of opinions and asymmetric information near public information releases, derives and tests empirically a model in which agents, who receive private information of heterogeneous quality, trade stocks before and after they have observed a public signal. He finds evidence that trading before announcements is negatively related to information asymmetry when dispersion of opinion is lower.

3.4 Motivation, Hypothesis and Research Design

Trading liquidity trends are mainly explained by the investors' behaviours that differ amongst investors and classes of investors in function of their private information's precision. Different levels of information's precision aim at the pres-

ence of asymmetric information amongst investors that is likely to rise around earnings announcements, as shown in Krinsky and Lee (1996). Generally, trading volume is positively related to the asymmetric information, but when there is time discretion the relation is likely to become negative, as shown in Admati and Pleiderer (1988) and in Foster and Viswanathan (1990). The goal of this article is to empirically verify the existence of this inverse relationship for a sample of Swiss listed firms, contributing to the research field opened by Chae (2005) with his evidence on U.S. firms. I analyze trading volume trends before scheduled earnings announcements. The choice of earnings announcements is due to the characteristic that they release specific firms' information at predefined times that are known to the public. Before such events, asymmetric information between informed and uninformed investors is higher[60] and the adverse selection problem of the uninformed investors worsens as argued by Wang (1994). In this situation, rational uninformed investors, to protect themselves from adverse selection risk, either tend to postpone their investment after the announcement when an adverse selection problem is resolved, or demand a higher discount price in order to cover the risk of trading against informed investors.

These behaviours should have both a negative impact on trading volume before earnings announcements and a positive impact on the relationship between trading volume and simultaneous price change. In fact, if an uninformed trader is time discretionary, he can decide to postpone their investments until the adverse selection problem is less severe or resolved. By doing so, the trading liquidity before an earnings announcement should decrease. This argumentation and the predictions of the previous researches suggest the formulation of the following hypothesis.

HYPOTHESIS 1: *Before a scheduled earnings announcement there is a decrease in the firm's trading liquidity because of the presence of asymmetric information amongst investors.*

[60] Informed investors increase their process of acquisition and elaborate private information in proximity of an earnings announcement, thereby increasing the asymmetric information with uninformed investors.

According to this hypothesis, it is likely that uninformed investors will trade less to avoid being overwhelmed by investors with more precise private information before scheduled announcements. On the other side, if uninformed investors are not time discretionary and cannot avoid trading, they will protect themselves by asking for a premium for trading against pre-disclosure private information. In response, the stock's price change should be positively related to trading liquidity before a scheduled earnings announcement. This argumentation suggests the formulation of the second hypothesis.

HYPOTHESIS 2: *Before a scheduled earnings announcement, the magnitude of the decrease in the trading liquidity should be positively related to the simultaneous price change because of the presence of asymmetric information amongst investors.*

Moreover, informed investors, using their pre-disclosure private information, try to anticipate the announcement by rebalancing their portfolio before news is released. In the case that they expect positive surprises from the earnings announcement, they can be motivated to ask for stocks at higher price levels even to take a position. In a contrary case, they can be motivated to not take a position or to close their position if they already have one. It follows that in case of positive earnings surprises ex-ante firm's price levels should increase more than in the case of non positive earnings surprises. This argumentation suggests the formulation of the following hypothesis.

HYPOTHESIS 3: *If there is a positive relationship between trading volume and simultaneous price change before a scheduled earnings announcement, the magnitude of the correlation should be higher in case of positive announcements surprises.*

I investigate the behaviour of the trading liquidity before a scheduled announcement with an event study analysis of the abnormal volume turnover ALVT. The abnormal log volume turnover is estimated from t = -10 to t = +10 days around earnings announcements using the trading volume market model indicated by Tkac (1999). The parameters of the model are estimated on a pre-event window of 200 days from t = -210 to t = -11 days before the announcement at t = 0. The results' ro-

bustness is checked using a different estimation period, the raw measure of the volume turnover and a different method of estimation for the abnormal volume turnover.

In the second part of the empirical analysis, the pooled regression technique is used first, to confirm the event study results and second, to analyze the relationship between the firm's trading activity and the ex-ante price change. In the last part, a firm fixed effect model is used to test if the presence of asymmetric information is the motivation of the decrease in trading liquidity before scheduled announcements.

3.5 Sample selection and descriptive statistics

The selection of the sample is determined by the available information on the firm's earnings announcement date. Unfortunately, in contrast to U.S. and other European Countries, for the Swiss firms there is not a predefined and complete database with time series information on the firm's earnings announcement, so the only way to get a reasonable sample of analysis is to do firm by firm research. I have built the sample using the earnings announcements' dates on the press releases of firms listed on the Swiss Exchange stock market. For this task I have used the LexisNexis database, which contains a necessary number of financial firm's press releases. I have found 1901 announcements[61] from 1995 to 2006 distributed on 89 non-financial Swiss firms. Financial data are collected in Datastream Advance. For each event, I have collected information on the volume turnover VT from 211 days trading before to 10 days trading after the announcement, building an estimation window of 200 days trading and an event window of 20 days trading. A successive selection criterion of at least 90 observations in the estimation window and of at least 15 observations in the event window has excluded 361 events, reducing the final analysis's sample to 1540 events distributed on 85 non-financial firms. Panel A of Table 3.1 reassumes the procedure of selection process and panel B shows the distribution

[61] Quarter, Semiannual and annual Earnings announcements.

of the events throughout the years. It is evident how low the numbers of events are before 1999. This is due to the fact that the firm's earnings press releases are systematically reported in the LexisNexis database only after 1999, while in the preceding period not all the earnings press releases are available, especially for the small firms. Where the firm's press releases were not available, I collected the information in different financial newspapers that are also available in the LexisNexis database. Panel C of the table 3.1 classifies the event by type differentiating amongst first, second, third and fourth quarter. It is interesting to outline that some small firms[62] disclose earnings only relatively to the second and the last quarter, and this behaviour explains why the number of events is higher in correspondence with these periods. Table 3.2 reports descriptive statistics of the analysis's sample. The firm's market value on the day of the announcement is 12031.4 and 1086.6 millions of CHF in mean and median, respectively. Sub-periods statistics show that observations before 1998 are mainly referred to large firms. In fact, while the average market value is of 18.7 billion for the sub-period 1995-1998, it is of 12.5 billion and of 10.8 billion for the sub-periods 1999-2002 and 2003-2006, respectively. Moreover, the minimum observation is of 96.76 million for the sub-period 1995-1998, against the minimum observation of 6.44 and 8.46 millions for the two following sub-periods. This reveals that more information is always made available for the medium and small firms over time.

Daily average volume turnover is 1.95% for the whole sample of analysis. The sub-periods statistics show a decreasing trend for the average volume turnover ratio over time. This decreasing trend, which passes from 10.93% in the period 1995-1998 to 0.36% in the period 2003-2006, is due to the progressive introduction over time of events referred to small firms.

[62]Generally, firms that disclose only two times per fiscal year are those that do not following an international accounting standard.

3.6 Event Analysis

3.6.1 Variables' description.

Volume turnover is always a positive measure and its distribution with positive skewness and extreme kurtosis (5.187 and 28.761, respectively) presents large departures from normality. In order to make the turnover distribution better behaved, I apply the logarithmic transformation on the volume turnover ratio. Thus, daily log volume turnover τ_t^i is defined as:

$$\tau_t^i = Log\left(0.0005 + \frac{Trading\ Volume_t^i}{\#\ of\ \ Outstanding\ \ Shares_t^i}\right) \tag{3.1}$$

Event analysis is conducted on the abnormal log volume turnover ξ_i^t that is calculated as the difference between the observed log volume turnover and the estimated log volume turnover.

$$\xi_i^t = \tau_i^t - \hat{\alpha}_i - \hat{\beta}_i * \tau_M^t \tag{3.2}$$

where α_i and β_i are estimated using the one factor trading volume market model indicated in Tkac (1999). The trading volume market model is the following:

$$\tau_i^t = \alpha_i + \beta_i * \tau_M^t + \varepsilon_i^t \tag{3.3}$$

where τ_i^t is the log volume turnover ratio at time *t* for announcement *i* and is calculated as the ratio between the firm's daily number of shares exchanged and the firm's daily total number of common shares outstanding; τ_M^t is the market volume turnover ratio at time *t* and is given by the ratio of the aggregate number of the daily shares exchanged on the aggregate number of the daily common shares outstanding

of all the firms[63] of the Swiss Performance Index SPI. The parameters α and β are estimated on a pre-event window of 200 days from t = -210 to t = -11 days before the announcement at t = 0.

3.6.2 Empirical Results

Event study reports a statistical decrease in the firm's trading liquidity before a scheduled announcement. Table 3.5 reports daily cross sectional means and medians of the abnormal log volume turnovers from 10 trading days before to 10 trading days after the event. From t = -10 to t = -2 means and medians abnormal log volume turnovers are negative, indicating a decreasing trend in the firm's trading liquidity. However, not all the negative signs are statistically significant, but statistically significant is the mean and the median of the daily abnormal log volume turnovers from 10 to 3 days before the scheduled announcement, showing an average decrease of 2.12% (p-value 0.0000) and a median decrease of 3.19% (p-value 0.0000) per day with respect to the pre-event period. The day before the event, abnormal log volume turnover starts to increase, increasing by around 5% in mean and in median. This increase, which is also evident in the Chae's analysis (2005), is due to the increase of the investor's beliefs in proximity of the announcements[64]. Around the time of the announcement, from two days before to two days after the event, the abnormal log volume turnover increases by 14.5% and 11.5% in mean and in median, respectively. After the event, results are in line with voluminous previous research reporting a statistical significant increase in the trading volume.

Similar results are of a cumulative point of view. Figure 3.1 shows the pattern of the cumulative abnormal log volume turnover[65]. There is a decreasing trend

[63] I have used all the firms included in a predefined stocks list of the Worldscope database called "WSCOPESW.LLT". In April 2007, that list contains 411 firms that were and are traded on the Swiss exchange stocks market.

[64] As suggested in Ziebart (1990), Atiase and Bamber (1994), Bamber, Barron and Stober (1997), Kim and Verecchia (2001), near earnings announcement investors not only start to use their private pre-disclosure information, but also consider the pre-disclosure signals coming from the market. This has a consequential impact on the investor's beliefs.

[65] Cumulative Abnormal Log Volume Turnover CALVT is defined as the sum of the daily Abnormal Log Volume turnover.

from 10 to 2 days before the event and an increasing trend from the day before the event until the end of the period of analysis. The cumulative abnormal log volume turnover from 10 to 2 days before the event is negative indicating a decrease of 17%. This result confirms the hypothesis of the existence of a decrease in the firm's trading liquidity before a scheduled announcement. Furthermore, these results are confirmed by the sub-sample analysis.

In the sub-sample analysis I divided the sample into more sub-samples by function of the firm's size at the event day, in function of the announcement's period, in function of the firm's industry level and in function of the type announcement. On average, the abnormal log volume turnover estimations of the sub-samples are in line with the full sample, revealing some interesting characteristics.

The sub-sample by firm's size is built considering the firm's closing market value on the announcement day. Observations are divided into quintiles in function of the firm's size from the smallest Quintile 1 to the larger Quintile 5. Table 3.6 reports results of the cross sectional means and medians of the abnormal log volume turnovers estimation before, around and after the earnings announcement. Averages of the daily abnormal log volume turnovers from 10 to 3 days before the event are negative and statistically significant for all the quintiles except the first that is negative but insignificant. The same evidence for the medians abnormal log volume turnover is significant for the first quartile, too. These results confirm, as in the whole sample analysis, the existence of a decrease in the firm's trading liquidity before an earnings announcement. Moreover, the analysis reports that the magnitude of the decrease is positively related to the firm's size, suggesting that it is higher for the small firms. In fact, the median decrease for the two small quintiles are of 6.15% and 4.68 % per day from t = -10 to t = -3 against the 2.35% and 0.74% of the two larger. The same trend exists for the averages, except for the first quintile that is statistically insignificant. This evidence is not confirmed by the univariate analysis between firm size and abnormal volume turnover that, as reported in table 3.4, shows the existence of a negative (δ = -0.0005) but insignificant (p-value = 0.9837) correlation.

The sub-sample by periods is built considering the year in which the earnings announcement is made. I have aggregated the different years in three periods: before 1999, from 1999 to 2002 and from 2003 to 2006. Table 3.7 reports results of the cross sectional means and median of the abnormal log volume turnover before, around and after earnings release. For all the periods there is a significant decrease in the abnormal log volume turnover from 10 to 3 days before the announcement. Moreover, even if the events in years prior 1999 are referred mainly to large firms, the trend is decreasing, revealing that the magnitude of the decrease in the volume turnover before a scheduled announcement was higher in the past years than in the recent years. This is in line with the increase in the source of information of the last decade that has contributed to a decrease in the levels of asymmetric information amongst investors.

The analysis by sectors shows the existence of a negative abnormal log volume turnover before the announcement for all of the sectors. Results, reported in table 3.8, show that the averages and medians decreases in abnormal log volume turnover from 10 to 3 days before the announcement are always statistically significant, going from the lowest decreases of 0.71% of the industrial sector to the higher of 4.01% of the consumer goods and services sector. These results confirm the existence of a decrease in trading liquidity before earnings announcement.

Finally, table 3.9 reports results of the subsample analysis by type of announcement, differentiating amongst first Q1, second Q2, third Q3 and fourth Q4 quarter earnings announcements. It is interesting to note that the decrease in the abnormal log volume turnover before the event is insignificant for the Q1 announcements while significant for the Q4 announcement only in median. Considering that Q1 and Q4 announcements are disclosed closely in terms of time, sometimes even on the same day, and that the Q4 releases are often preceded by sales announcements, it follows that in proximity of the disclosure relative to the last quarter more forecasts and information on the possible firm's earnings are available, thus reducing the level of asymmetric information amongst investors with a consequential positive effect on the decrease in the trading liquidity. So, the analysis by type of announcements reveals that the trading liquidity before an earnings

announcement decreases significantly for the second and third quarter announcement while it is insignificant for the first and fourth announcement.

In conclusion, event analyses of the whole sample and of the different subsamples report a significant decrease in the abnormal volume turnover before earnings announcements, confirming empirically the first hypothesis.

3.6.3 Robustness Check

The event study of the abnormal volume turnover is made with an estimation window from t = -211 to t=-11 days before the scheduled announcement. As a first robustness check, I used a short estimation window. The first column of the table 3.10 reports event study summary with an estimation period from t = -70 to t = -11 days. The results are in line with the previous, showing a decrease in the abnormal log volume turnover of 1.57% (p-value = 0.0000) in mean and of 3.32% (p-value = 0.0000) in median per day from 10 to 3 trading days before the event. As a second robustness check, I used the raw volume turnover instead of log volume turnover. The estimated abnormal volume turnover is again significantly negative in mean and in median, therefore confirming the decreasing trend of the trading liquidity before earnings announcements. As a final robustness check, a different method of estimation of the abnormal volume turnover was used. I estimated the abnormal log volume turnover as difference between the daily log volume turnover and a benchmark log turnover $\tau_{B,i}^{t}$ defined as the average of the daily log volume turnover on a pre-event period of 40 days trading.

$$\xi_i^t = \tau_i^t - \tau_{B,i}^t \quad \text{where} \quad \tau_{B,i}^i = \frac{1}{40}\sum_{t=-50}^{t=-11}\tau_i^t \ . \tag{3.4}$$

Event study results, reported in the last column of table 3.10, are again in line with the previous, reporting a significant daily decrease of 0.93% (p-value=0.0004) and

of 2.92% (p-value=0.0000) in median from 10 to 3 days trading before earnings announcements.

The obtained results are robust to the change of the estimation window, to the using of raw volume turnover and to the using of a different method of estimation of the abnormal volume turnover. There is still, as reported in table 3.10, a significant decrease in the abnormal volume turnover from 10 to 3 days before the scheduled announcement.

3.7 Regression Analysis

The event analysis confirms an average decrease in the firm's trading liquidity before an earnings announcement. The aim of the regression analysis section is to confirm and explain this trend, trying to identify relations with investor's and firm's characteristics. I tested the change in firm's trading liquidity in a period of time before the earnings announcement using panel data regression analyses. Then, I analyzed the relationship amongst the firm's trading activity and the price change in order to test the second and third hypothesis. I controlled the regressions for variables like the firm size, which should be positively related to the trading activity due to the presence of adverse selections that motivates investors to invest more in large firms, for the share price's level, which should be inversely related to the trading activity because for an equal amount of investment it is possible to change more shares if the price is small, and for the return volatility, which should be positively related to the trading activity because of a variation in volatility that increases around earnings announcements as various empirical studies have shown[66]. This implies a change in the risk level that could not be more compatible with the risk aversion's degree of some investors, who precede in a portfolio rebalancing with a consequential increase in the trading activity.

[66] For example, Donder and Vorst (1996), analyzing the derivatives of implied volatility around a scheduled earnings announcement found that the implied volatility increased significantly during the pre-event period and reach a maximum on the event. After the news release, implied volatility drops and gradually moves back to its long-run level.

To test the decrease in volume before a scheduled announcement, I regressed the daily abnormal log volume turnover ALVT on a dummy variable DPERIOD, which indicates the period before the event, and on various control variables to consider both the firms characteristics and the time effects. The model used is the following:

$$ALVT_t^i = \alpha_0 + \alpha_1 DPERIOD_t^i + \alpha_2 Log(MV_0^i) + \alpha_3 Log(PRICE_t^i) + \\ + \alpha_4 \left|\Delta Volatility_0^i\right| + \sum_{y=1996}^{y=2006} \alpha_y DTIME_y + \varepsilon_t^i \quad (3.5)$$

where *i* indexes announcement events from 1 to 1540, *t* indexes days from 10 before to 10 after the event of announcement, ALVT indicates the abnormal log volume turnover estimated using the volume market model on an estimation window from 210 to 11 days trading before the event, DPERIOD is a dummy variable equal to 1 for days before the event, 0 otherwise, Log(MV) is the logarithm of the firm's market value at t=0, Log(Price) is the logarithm of the mean firm's share price from t=-10 to t=-3, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event, and DTIMEy are dummy variables controlling for year effects from 1995 to 2006.

The results, reported in table 3.11, show the existence of a significant negative relation (α_1 = -0.0957; p-value = 0.0000) between the explanatory variable and the dummy indicating the period before the event, confirming the existence of an average decrease in firm level liquidity before the event of a scheduled announcement, hence in line with the event study evidence. This relation remains significant (α_1 = -0.0957; p-value = 0.0000) after controlling for some firms' characteristics like the firm size, the stock price and the return volatility, and for the years effect.

To analyze the relation amongst the price variation and the firm trading activity, I regress the absolute percentage of the daily firm's share price variation on the daily abnormal log volume turnover ALVT before the event. The model used is the following:

$$\left|\Delta\%PRICE_t^i\right| = \alpha_0 + \alpha_1 ALVT_t^i + \alpha_2 Log(MV_0^i) + \alpha_3 Log(PRICE_t^i) + \\ + \alpha_4 \left|\Delta Volatility_0^i\right| + \sum_{y=1996}^{y=2006} \alpha_y DTIME_y + \varepsilon_t^i \tag{3.6}$$

where *i* indexes announcement event from 1 to 1540, *t* indexes days around the event of announcement, Δ%Price is the percentage difference between the daily price level and its lagged, ALVT indicates the abnormal log volume turnover estimated using the volume market model on an estimation window from 210 to 11 days trading before the event, Log(MV) is the logarithm of the firm's market value at t = 0, Log(Price) is the logarithm of the daily firm's share price, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event, and DTIMEy are dummy variables controlling for year effects from 1995 to 2006.

Regression results, reported in table 3.12, show the existence of a significant positive relationship between the simultaneous price change from t = -10 to t = -3 days before the announcement and the ALVT (α_1 = 0.01383; p-value = 0.0000). This suggests that, in correspondence of a higher stock price variation there is a lower decrease in trading liquidity before the announcement. Similar results (α_1 =0.0136; p-value = 0.0000) when the regression is made for a period of time from t = -8 to t = -2 days before the event.

Table 3.13 reports regression results when the percentage price change is related with the cross product between the simultaneous abnormal log volume turnover and a dummy variable DPOSITIVE, which is used as proxy of the quality of the announcement and is expressed in function of the price's return variation after the announcement. An increase in the firm's price level after the announcement reveals that the announcement was *positive*, while a decrease shows that it was *no-positive*. Considering that the informed investors already have an expectation on the quality of the announcement, it is possible to identify a relationship between change

in simultaneous stock's price and expected quality of the announcement. Results shows a positive relationship ($\alpha_1 = 0.0046$; p-value = 0.0804), indicating that in the case of a positive earnings release the ex-ante magnitude of the simultaneous price change is higher than in the case of a non positive earnings release.

This regressive analysis confirms the second and third hypothesis, revealing that before earnings announcements there will be a decrease in firm's trading liquidity, which is positively related to the simultaneous price change whose magnitude is higher in case of positive earnings release.

3.7.1 Endogeneity

The relation between the simultaneous price change and the trading activity could be endogenously determined. That means, the change of the firms' price shares is not a consequence of the variation in trading activity, but a simultaneous event, suggesting that firms that achieve a certain change in the levels of price are those that recognize lower decrease in trading activity. To test this, I estimate a simultaneous equations system in which the two variables of abnormal log volume turnover and of percentage price variation are endogenously considered. The regression of the simultaneous equations model is made with the pooled two stage last squares 2SLS procedure. Results, reported in the last column of the table 3.12, show the existence of a significant positive relation ($\alpha_1 = 0.01985$; p-value = 0.0000) between the absolute value of the percentage share price change and the trading activity variation. Hence, in line with the result of the pooled OLS regression.

3.8 Asymmetric information

The event analysis has shown the existence of a significant decrease in the trading liquidity before an earnings announcement. This decrease is due to a problem of adverse selection. In fact, before such events, asymmetric information between informed and uninformed investors is higher [Krinsky and Lee (1996); Saffi (2006)]

and uninformed investors tend to postpone their trading after the announcement when the adverse selection problem is resolved [Foster and Viswanathan (1990)].

The goal of this section is to test if the presence of asymmetric information is the motivation of the decrease in trading liquidity before scheduled announcements. For this purpose, I related the cumulative abnormal volume turnover before the announcement with variables like firm size and bid-ask spread, which are used as proxy for asymmetric information. Firm size and bid-ask spreads are indicated in literature as reasonable proxy for the asymmetric information. Amongst researchers that report evidence on the firm size, Atiase (1985) and Freeman (1987) report empirical evidence that an investor's incentive to acquire private predisclosure information is higher for large firms than for small firms, suggesting that the asymmetric information is decreasing in firm size; Bamber (1987) suggests that small firms have higher levels of asymmetric information than the larger ones due to the limitation of their numbers and sources of information; Merton (1987) argues that the existence of asymmetric information could explain why uninformed investors do not invest at all in certain securities such as the small firms' stocks; and Lev and Penman (1990) report that more forecast on earnings are reported in the financial press for large firms than for small firms. Amongst researchers that report evidence on the bid-ask spread, Glosten and Milgrom (1985), using a formal model to show how the bid-ask spread arises from the adverse selection, show that the bid-ask spreads are positively related with the asymmetric information; Lee, Mucklow and Ready (1993) in their analysis on the relation amongst spreads, depths and earnings information, show evidence that firms with lower bid-ask spreads have a lower degree of asymmetric information; Greenstein and Sami (1994), in analyzing the effect of the increase in disclosure on bid-ask spread with a time series approach, observe that the spread decreases more rapidly for firms with a low initial information level; and Welker (1995), analyzing for a sample of firms listed on the NYSE the relation between information level and bid-ask spread, reports evidence that the bid-ask spread is higher for firms with a low information index with respect to those with a higher one, therefore in line with the prediction that an increase in the information level reduces the spread between ask and bid price. From this evidence, it can be deter-

mined that the asymmetric information is a negative function of the firm size and a positive function of the bid-ask spread. Furthermore the univariate analysis reports evidence of a negative correlation (δ = -0.1544; p-value = 0.0000) between the firm size and the bid-ask spread, confirming for the analysis's sample that the small firms are those with higher bid-ask spreads, hence with higher levels of asymmetric information.

The first hypothesis implies that the larger the asymmetric information, the less trading activity will occur before earnings announcements. It follows that we should expect a positive statistical relation between trading volume and firm size and a negative statistical relation between trading volume and bid-ask spread before earnings announcements.

To test the relation between trading liquidity and asymmetric information, I use a panel data regression and, considering the presence of both firms and periods (time) effects, and that the time effect is not constant during years[67], the more appropriate estimation procedure is to control both by firm and by time effect, as suggested in Petersen (2006).Therefore, I ran a pooled time series regression using the following firm fixed effect model:

$$CALVT[-10,-3]_{i,t} = \alpha_i + \varphi_t + \beta * \log(AI_{i,t}) + \sum_n \gamma_n * CV_{i,t,n} + \varepsilon_{i,t} \qquad (3.7)$$

where *i* indexes firms from 1 to 85, and *t* indexes periods from 1 to 48. The dependent variable is the cumulative daily abnormal log volume turnover CALVT from 10 to 3 days before the announcement, α_i is a dummy variable corresponding to the firm fixed effect, φ_t are dummies variables corresponding to the period (time) effect, AI is the proxy for the asymmetric information level, $CV_{i,t}$ is a set of *n* control variables and $\varepsilon_{i,t}$ is a random disturbance assumed to be possibly heteroskedastic and correlated within firms.

[67] The OLS White heteroskedasticy consistent regression reports decreasing significance estimation relatively to the year dummies from 1995 to 2000 and insignificant estimation from 2001.

The regression's results when the firm size is used as proxy for the asymmetric information are reported in table 3.14. There is evidence of an insignificant negative relation (β = -0.0177, p-value = 0.8444) between the cumulative abnormal log volume turnover and the firm market value. This relation remains insignificant (β = 0.0625, p-value = 0.6693) after controlling the relation for some factors like the price level, the price change and the return volatility. The insignificant relation suggests that the cumulative abnormal volume turnover before the announcement is not correlated to the firm's market value.

Regression results when the bid-ask spread is used as proxy for the level of asymmetric information are reported in table 3.15. The relation between the cumulative abnormal log volume turnover from 10 to 3 days before the announcement and the bid-ask spread is insignificant (β = 0.0741, p-value = 0.2744) and it remains insignificant (β = 0.0782, p-value = 0.2221) after controlling for factors like the price level, the price change and the return volatility. The insignificant relation does not show evidence that the cumulative abnormal volume turnover before the announcement is correlated with the bid-ask spread.

This analysis does not show evidence that the decrease in trading liquidity is correlated either to the firm size or to the bid-ask spread. Moreover, considering the univariate analysis that shows an insignificant correlation between the abnormal trading liquidity and the firm size, and a significant but positive relation between the abnormal trading and the bid-ask spread, it is possible to conclude that there is no evidence of a relationship between decrease in trading liquidity and asymmetric information. This result is not in line with the prediction that the existence of asymmetric information amongst different types of investors is the reason for the decrease in the firm's trading liquidity before earnings announcements. At least two reasons could justify the insignificant results. The variables used as proxies and the effect on the asymmetric information from the open order book market's characteristic.

The use of the firm size as proxy of the asymmetric information could be too generic, considering also the restricted number of observations of the analysis's sample. In fact, the firm size can be used as proxy for different effects; hence it could be

more appropriate to use a specific proxy as, for example, the dispersion of the analysts' earnings forecasts. In this analysis I did not follow this approach because of the data unavailability, especially for the small firms. Moreover, the use of the bid-ask spread, which is the canonical tool to proxy for the asymmetric information, also doesn't yield significant results. Probably, this is due to the fact that in computing the bid-ask spread, I have used the last day bid price and the last day ask price. By using a intraday bid and ask traded price, the results can become more significant. A second possible reason of this evidence, which is contrary to the Chae (2005) results, may arise from the fact that in an open order book market the adverse selection problem could be lower due to the possibility to read the order book before trading. In fact, investors, due to this characteristic, can infer information on the counterparty, with a positive impact on the asymmetric information's level.

3.9 Summary and conclusions

In this study I analyze the trend of the trading volume before a scheduled earnings announcement for a sample of Swiss listed firms. The aim is to contribute to the research field opened by Chae (2005) with his evidence on the U.S. firms. Unlike Chae's research (2005), my analysis is conducted on firms listed in a stock-exchange market with a limited order book.

Generally, abundant literature provides evidence of a positive relation between trading volume and asymmetric information. However, when there is a scheduled event like the earnings announcement, this relation is likely to be inverted by the presence of time discretionary investors who, because of an adverse selection problem, tend to postpone their investments when this problem is less severe. The consequence is a decrease in the firm's trading activity before the event.

The analysis of the trading volume is made with various approaches. In the first part, an event study of the abnormal log volume turnover around the event is performed with the aim of testing the decrease in the trading activity in the period before the event. Results report a daily average decrease of 2.12 percent in the ab-

normal volume turnover from 10 to 3 trading days before the announcement. Moreover, the subsample analysis confirms this trend, highlighting that the magnitude of the decrease in trading activity declines over the years, hence it is in line with the increase in the source of information in the last decade that has contributed to lower the levels of asymmetric information amongst investors. Results of the event study empirically confirm the first hypothesis and they are robust to the change of the estimation window, to the use of the raw volume turnover and to the use of a different method of estimation of the abnormal volume turnover. In the second part of the analysis, a pooled time series regression of a model that relates the abnormal log volume turnover before the event with the simultaneous price change is estimated, with the aim of investigating the relation amongst the firm's trading activity, the price variation and its magnitude in the case of ex-post positive earnings announcements. Regression results confirm the existence of a positive relation between the abnormal volume trading and the simultaneous price change, and also confirm that the magnitude of the price variation is higher when positive earnings are released. In the last part, a pooled time series regression of a model that relates the cumulative abnormal log volume turnover before the announcement with the firm's asymmetric information level is estimated, with the aim of verifying if the necessary condition of the decrease in trading liquidity is the presence of asymmetric information measured by the firm size and the bid-ask spread. Regressions results do not show statistical evidence of any connection between the cumulative abnormal volume turnover and the level of asymmetric information. A possible motivation could be the open order book characteristic of the exchange market. In fact, it is known that in an open order book exchange market, information asymmetries amongst investors are lower than in a specialist market, if nothing else because there are lower inventory risks and higher transparency[68].

The magnitude of the decrease in the trading volume before scheduled announcements is similar compared to Chae's (2005) evidence for the U.S. case, (cumulative average abnormal log trading volume of 17% against over 15%), and dif-

[68] In an open order book market investors have access to the order book and can infer their competitors' information.

ferently from Chae (2005), this analysis does not reveal statistical evidence of a relation between a decrease in trading liquidity and asymmetric information amongst investors. However, we must consider that in an open order book exchange market information asymmetries are lower because of the possibility to read the order book, and this should have an effect in resolving the adverse selection problem of the uninformed investors.

In conclusion, this study accepts the hypothesis of the existence of a decrease in the trading liquidity before a scheduled earnings announcement but does not confirm that the decrease is due to the presence of asymmetric information. Moreover, this analysis shows that matching a lower decrease in trading liquidity before an earnings announcement there is a higher increase in the simultaneous price variation and that the magnitude of the variation is higher in case of positive announcement surprises. One limitation of this study is given by the low availability of the earnings announcement date, above all for events before 1999, in which the earnings disclosure dates are available almost only for the large firms. This limit should be considered for future research, along with the suggestion to verify the existence of these relationships not only for firms listed to the Swiss stock exchange. Furthermore, considering that the basic motivation of the decrease in liquidity before a scheduled announcement is the existence of asymmetric information amongst investors, the evidence of a relation between decrease in trading liquidity and asymmetric information should be analyzed with a different approach. Finally, it may be interesting to verify if the increasing use of derivatives can also help to explain the falling trend in the trading activity before scheduled earnings announcements.

3.10 References

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3.11 Tables

TABLE 3.1: Sample Selection Procedures

The table reports figures on the sample selection. Panel A summarizes the selection procedure. The sample is composed by non-financial firms that were and are included in the Swiss Performance Index SPI from 1995 to 2006 and for which it was possible to point out the dates of earnings announcements. Excluded events are considered events for which are not available at least 90 trading days on the estimation window and at least 15 trading days on the event window of the volume turnover ratio, that is defined as the ratio of the daily number of the share changed on the total number of shares outstanding. In panel B for each year the number of events in the sample analysis is reported. In panel C the total number of events found are classified in function of the type of event amongst all the quarter earnings announcements (Q1, Q2, Q3 and Q4) available.

Panel A: Sample selection

	Number	*Percent*	*Distibuted on:*
Event found	1901	100%	89 firms
Event excleded	361	19%	
Total events Sample	1540	81%	85 firms

Panel B: Event by Year

Year	*N*	*%*	*Year*	*N*	*%*	*Year*	*N*	*%*
1995	4	0.26%	*1999*	71	4.61%	*2003*	202	13.12%
1996	24	1.56%	*2000*	161	10.45%	*2004*	203	13.18%
1997	33	2.14%	*2001*	181	11.75%	*2005*	214	13.90%
1998	51	3.31%	*2002*	198	12.86%	*2006*	198	12.86%

Panel C: Event by Type

Type	*N*	*%*
Q1 First Quarter	255	16.56%
Q2 Second Quarter	494	32.08%
Q3 Third Quarter	280	18.18%
Q4 Fourth Quarter	511	33.18%

TABLE 3.2: Summary Statistics

The table reports descriptive statistics of the analysis's sample. Volume Turnover is the ratio of the daily number of shares traded on the total number of shares outstanding, Log Volume Turnover is the log of the volume turnover and Market value is the firm's market value in millions of Swiss francs. Statistics on Volume turnover are computed on a period of one year (266 days trading) before the event of the earnings announcement while the firm's market value is observed at the announcement's day.

Period	*Mean*	*Median*	*St.Dev*	*Skewness*	*Kurtosis*	*N*
			Daily Volume Turnover			
1995-2006	0.0195	0.0031	0.0624	5.1872	28.7613	1540
1995-1998	0.1093	0.0151	0.1528	1.2098	-0.0102	112
1999-2002	0.0244	0.0048	0.0610	4.7931	26.7680	611
2003-2006	0.0036	0.0026	0.0040	3.7985	19.5376	817
			Daily Log Volume Turnover			
1995-2006	-1.9936	-2.1094	0.3541	2.5391	6.7169	1540
1995-1998	-1.4954	-1.8166	0.6604	0.4822	-1.3771	112
1999-2002	-1.9190	-2.0579	0.3831	1.6262	2.3780	611
2003-2006	-2.1176	-2.1386	0.1173	1.3273	2.5623	817
			Market Value			
1995-2006	12031	1087	33503	3.6827	16.0374	1540
1995-1998	18747	1811	35796	2.1756	6.7679	112
1999-2002	12465	1180	34881	3.6782	16.0399	611
2003-2006	10787	879	32020	3.9652	17.9918	817

TABLE 3.3: Explanatory Variables

The table reports statistics of the explanatory variables. MV is the firm's market value in millions of Swiss francs and is observed at the announcement day. Price is the average firm's share price. BAS is the average of the daily bid-ask spread ratio (difference between ask and bid divided by the average of the bid and the ask) and is calculated with the daily close bid and ask prices. Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event. Δ%Price is the average of the percentage difference between the daily price level and its lagged value. All averages are calculated from t = -10 to t = -3., DPositive is a dummy variable equal to 1 when the cumulative firm's share return on two days after the announcement is positive, 0 otherwise.

Variable	*Mean*	*Median*	*St.Dev*	*Max*	*Min*	*N*
MV	12031.43	1086.65	33503.2	201805.7	6.44	1540
Price	294.91	136.41	489.18	6543.75	0.87	1540
BAS	1.26%	0.76%	1.67%	16.32%	0.04%	1539
ΔVolatility	-0.08%	0.02%	1.43%	10.09%	-16.30%	1540
Δ%Price	0.09%	0.06%	0.86%	5.91%	-7.49%	1540
Dpositive	0.53	1	0.5	1	0	1540

TABLE 3.4: Correlations

The table reports a correlation amongst variables. MV is the firm's market value in millions of Swiss francs and is observed at the announcement day. BAS is the average of the daily bid-ask spread ratio (the difference between ask and bid divided by the average of the bid and the ask) and is calculated with the daily close bid and ask prices. Price is the average of the daily close firm's share price. Δ%Price is the average of the percentage difference between the daily close price level and its lagged. Δvolt is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event. The abnormal log volume turnover ALVT is the residual of the one factor volume turnover market model which parameters are estimated in a [-210,-11] days window and log volume turnover is defined as the log of the ratio of the daily number of shares traded on the total number of shares outstanding. DPositive is a dummy variable equal to 1 when the cumulative firm's share return on two days after the announcement is positive, 0 otherwise. All averages are calculated from t = -10 to t = -3. The p-values in parentheses are for a two-tail test of statistical significance.

	MV	*BAS*	*Price*	*Δ%Price*	*ΔVolt*	*ALVT*
BAS	-0.1544					
	(0.0000)					
Price	-0.0627	-0.0936				
	(0.0138)	(0.0002)				
Δ%Price	-0.0309	0.0145	-0.0237			
	(0.2259)	(0.5698)	(0.3518)			
ΔVolt	0.0026	-0.0098	-0.0060	0.0293		
	(0.9186)	(0.7006)	(0.8153)	(0.2497)		
ALVT	-0.0005	0.0493	0.0185	0.1489	-0.0505	
	(0.9837)	(0.0533)	(0.4670)	(0.0000)	(0.0475)	
Dpositive	0.0249	-0.0135	-0.0045	0.0306	0.0250	0.0098
	(0.3289)	(0.5974)	(0.8593)	(0.2302)	(0.3265)	(0.7003)
N	1540	1539	1540	1540	1540	1540

TABLE 3.5: Abnormal Volume Turnover

The table reports the cross sectional means and medians of the daily abnormal log volume turnover around a scheduled announcement for firms listed at the SWX between 1995 and 2006. The abnormal log volume turnover is the residual of the volume turnover market model which parameters are estimated in a [-210,-11] days window. Log volume turnover is defined as the log of the ratio of the daily number of shares traded on the total number of shares outstanding. [-10,-3], [-2,+2] and [+2,+10] indicate the period before, around and after an earnings announcement, respectively. A standard t-test is used to measure whether the mean is statistically different from zero and a Wilcoxon signed-rank test is used to measure whether the median is statistically different from zero. P-values for both tests are reported in parenthesis.

Time	*Mean*	*Median*
-10	-0.0254 (0.0009)	-0.0425 (0.0000)
-9	-0.0237 (0.0021)	-0.0366 (0.0000)
-8	-0.0234 (0.0022)	-0.0416 (0.0000)
-7	-0.0442 (0.0000)	-0.0520 (0.0000)
-6	-0.0225 (0.0026)	-0.0299 (0.0001)
-5	-0.0215 (0.0041)	-0.0248 (0.0002)
-4	-0.0115 (0.1321)	-0.0228 (0.0045)
-3	0.0023 (0.7693)	-0.0127 (0.4047)
-2	-0.0004 (0.9643)	-0.0074 (0.6406)
-1	0.0556 (0.0000)	0.0501 (0.0000)
0	0.3090 (0.0000)	0.2946 (0.0000)
1	0.2274 (0.0000)	0.2011 (0.0000)
2	0.1281 (0.0000)	0.1040 (0.0000)
3	0.0911 (0.0000)	0.0652 (0.0000)
4	0.0590 (0.0000)	0.0400 (0.0000)
5	0.0355 (0.0000)	0.0177 (0.0001)
6	0.0257 (0.0013)	0.0095 (0.0230)
7	0.0170 (0.0332)	-0.0039 (0.3973)
8	0.0147 (0.0621)	-0.0001 (0.1140)
9	0.0080 (0.3205)	-0.0081 (0.8885)
10	0.0027 (0.7368)	-0.0121 (0.6916)
[-10,-3]	-0.0212 (0.0000)	-0.0319 (0.0000)
[-2,+2]	0.1450 (0.0000)	0.1150 (0.0000)
[+3,+10]	0.0316 (0.0000)	0.0121 (0.0000)
Number of Obs. 1540		

TABLE 3.6: Abnormal Volume Turnover by Size

The table reports the cross sectional means of the daily abnormal volume turnover around an earnings announcement across a firm's size quintile. Quintile 1 contains the 20% smaller firms of the sample, while quintile 5 the 20% bigger. The abnormal log volume turnover is the residual of the volume turnover market model which parameters are estimated in a [-210,-11] days window and log volume turnover is defined as the log of the ratio of the daily number of shares traded on the total number of shares outstanding. (-10,-3), (-2,+2) and (+3,+10) indicate periods before, around and after the earnings announcement, respectively. A standard t-test is used to measure whether the mean is statistically different from zero and a Wilcoxon signed-rank test is used to measure whether the median is statistically different from zero. P-values for both tests are reported in parenthesis.

Time	Quintile 1	Quintile 2	Quitile 3	Quintile 4	Quintile 5
			Mean		
(-10,-3)	-0.0105	-0.0343	-0.0249	-0.0215	-0.0101
	(0.1773)	(0.0000)	(0.0000)	(0.0002)	(0.0136)
(-2,+2)	0.1593	0.1383	0.1652	0.1568	0.1128
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0514	0.0311	0.0500	0.0221	0.0117
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0045)
			Median		
(-10,-3)	-0.0615	-0.0468	-0.0398	-0.0235	-0.0074
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0111)
(-2,+2)	0.1069	0.1104	0.1280	0.1400	0.0911
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0030	0.0109	0.0204	0.0272	0.0042
	(0.0000)	(0.0010)	(0.0000)	(0.0000)	(0.0166)
Obs	308	308	308	308	308

TABLE 3.7: Abnormal Volume Turnover by Period

The table reports the cross sectional means and medians of the daily abnormal log volume turnover around a scheduled announcement across three periods of time. The abnormal log volume turnover is the residual of the volume turnover market model which parameters are estimated in a [-210,-11] days window and log volume turnover is defined as the log of the ratio of the daily number of shares traded on the total number of shares outstanding. (-10,-3), (-2,+2) and (+3,+10) indicate periods before, around and after the earnings announcement, respectively. A standard t-test is used to measure whether the mean is statistically different from zero and a Wilcoxon signed-rank test is used to measure whether the median is statistically different from zero. P-values for both tests are reported in parentheses. Obs. indicates the number of earnings announcements.

Time	1995-1998	1999-2002	2003-2006
		Mean	
(-10,-3)	-0.0554	-0.0335	-0.0073
	(0.0000)	(0.0000)	(0.0424)
(-2,+2)	0.0971	0.1160	0.1781
	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0370	0.0001	0.0574
	(0.0010)	(0.9785)	(0.0000)
		Median	
(-10,-3)	-0.0535	-0.0440	-0.0257
	(0.0000)	(0.0000)	(0.0000)
(-2,+2)	0.0544	0.0955	0.1410
	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0093	-0.0103	0.0310
	(0.0152)	(0.6892)	(0.0000)
Obs	112	611	817

TABLE 3.8: Abnormal Volume Turnover by Sector

The table reports the cross sectional means and medians of the daily abnormal log volume turnover around a scheduled announcement for firms in the SWX between 1995 and 2006. Each firm is assigned according to the Datastream industry classification to one of the following sectors: Basic Materials (BMATR), Consumer Services and Goods (CNSMS&G), Health Care (HLTHC), Industrials (INDUS), Technologies (TECNO), Utilities and Telecommunications (UT&TEL). The abnormal log volume turnover is the residual of the volume turnover market model which parameters are estimated in a [-210,-11] days window and log volume turnover is defined as the ratio of the log of the daily number of shares traded on the total number of shares outstanding. (-10,-3), (-2,+2) and (+3,+10) indicate periods before, around and after the earnings announcement, respectively. A standard t-test is used to measure whether the mean is statistically different from zero and a Wilcoxon signed-rank test is used to measure whether the median is statistically different from zero. P-values for both tests are reported in parentheses. Obs.indicates the number of earnings announcements.

Time	BMATR	CNSMS&G	HLTHC	INDUST	TECNO	UT&TEL
			Mean			
(-10,-3)	-0.0296	-0.0401	-0.0231	-0.0071	-0.0376	-0.0317
	(0.0002)	(0.0000)	(0.0010)	(0.1045)	(0.0000)	(0.0009)
(-2,+2)	0.1307	0.1209	0.1670	0.1539	0.1850	0.0251
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0870)
(+3,+10)	-0.0151	0.0421	0.0181	0.0450	0.0449	-0.0078
	(0.0581)	(0.0000)	(0.0140)	(0.0000)	(0.0000)	(0.4986)
			Median			
(-10,-3)	-0.0307	-0.0611	-0.0212	-0.0287	-0.0526	-0.0322
	(0.0000)	(0.0000)	(0.0004)	(0.0000)	(0.0000)	(0.0001)
(-2,+2)	0.1149	0.0796	0.1326	0.1211	0.1721	0.0070
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.1709)
(+3,+10)	-0.0168	0.0217	0.0183	0.0136	0.0306	-0.0127
	(0.0933)	(0.0000)	(0.0010)	(0.0000)	(0.0001)	(0.2367)
Obs	140	270	249	693	140	48

TABLE 3.9: Abnormal Volume Turnover by Type

The table reports the cross sectional means of the daily abnormal volume turnover around an earnings announcement across type of announcement differentiating amongst first, second, third and fourth quarter earnings disclosures. The abnormal log volume turnover is the residual of the one factor volume turnover market model which parameters are estimated in a [-210,-11] days window and log volume turnover is defined as the log of the ratio of the daily number of shares traded on the total number of shares outstanding. (-10,-3), (-2,+2) and (+3,+10) indicate periods before, around and after the earnings announcement, respectively. A standard t-test is used to measure whether the mean is statistically different from zero and a Wilcoxon signed-rank test is used to measure whether the median is statistically different from zero. P-values for both tests are reported in parentheses.

Time	Q1	Q2	Q3	Q4
		Mean		
(-10,-3)	0.0020	-0.0524	-0.0323	0.0071
	(0.7802)	(0.0000)	(0.0000)	(0.1523)
(-2,+2)	0.1315	0.1428	0.0948	0.1914
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0076	0.0218	-0.0119	0.0834
	(0.2851)	(0.0000)	(0.0564)	(0.0000)
		Median		
(-10,-3)	-0.0096	-0.0549	-0.0415	-0.0197
	(0.3009)	(0.0000)	(0.0000)	(0.0568)
(-2,+2)	0.1115	0.1142	0.0712	0.1601
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0108	0.0041	-0.0256	0.0544
	(0.0421)	(0.0015)	(0.0010)	(0.0000)
Obs	255	494	280	511

TABLE 3.10: Robustness Results

The table reports results of robustness check analysis of the abnormal volume turnover around earnings announcements for a sample of Swiss firms listed at the SWX between 1995 and 2006. The first column reports cross sectional means and medians when the abnormal log volume turnover is estimated with the one factor market turnover model on a prevent window of 60 days trading. The second column reports cross sectional means and medians of the raw abnormal volume turnover estimated with the one factor market turnover model on a pre-event window of 200 days trading. The last column report cross sectional means and medians when the abnormal log turnover is calculated as the difference between the observed log volume turnover and a benchmark log volume turnover defined as the average of log volume turnover on a pre event period of 40 days trading. (-10,-3), (-2,+2) and (+3,+10) indicate periods before, around and after the earnings announcement, respectively. A standard t-test is used to measure whether the mean is statistically different from zero and a Wilcoxon signed-rank test is used to measure whether the median is statistically different from zero. P-values for both tests are reported in parentheses. Obs. Indicates the number of earnings announcements.

Time	ALVT [-70,-11]	AVT [-210,-11]	Benck 40
		Mean	
(-10,-3)	-0.0157	-0.0027	-0.0093
	(0.0000)	(0.0000)	(0.0004)
(-2,+2)	0.1547	0.0081	0.1612
	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0395	0.0016	0.0437
	(0.0000)	(0.0019)	(0.0000)
		Median	
(-10,-3)	-0.0332	-0.0006	-0.0292
	(0.0000)	(0.0000)	(0.0000)
(-2,+2)	0.1200	0.0002	0.1238
	(0.0000)	(0.0000)	(0.0000)
(+3,+10)	0.0192	-0.0004	0.0224
	(0.0000)	(0.0000)	(0.0000)
Obs	1540	1540	1540

TABLE 3.11: Abnormal Volume Turnover around the event
OLS Pooled regression

Variable	ALVT $-10 \leq t \leq 10$	ALVT $-10 \leq t \leq 10$
Constant	0.0891	0.1016
	(0.0000)	(0.0000)
DPeriod	-0.0957	-0.0956
	(0.0000)	(0.0000)
Log(MV)	-	-0.0026
		(0.0021)
$Log(Price_t)$	-	-0.0011
		(0.4318)
$\lvert\Delta Volatility\rvert$	-	2.1344
		(0.0000)
Years dummy	Yes	Yes
R squared	0.0303	0.0361
Adj. R squared	0.0299	0.0355
F-statistic	80.82	77.26
Prob(F-statistic)	0.0000	0.0000
No. announcements	1540	1540
No. Obs	31038	31038

The table presents the OLS Pooled regression of the abnormal volume turnover around the scheduled announcement. The dependent variable is the daily abnormal log volume turnover ALVT estimated with the market volume turnover model. DPERIOD is a dummy variable equal to 1 for days before the event, 0 otherwise; Log(MV) is the logarithm of the firm's market value at t=0; Log(Price) is the logarithm of the daily close firm's share price, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event, Years dummy indicates the presence of dummy variables controlling for year effects from 1995 to 2006. Standard errors are clustered by time and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 3.12: Percentage Price Change before the event
OLS/2SLS Pooled regression

Variable	**OLS** |Δ%PRICE| $-10 \leq t \leq -3$	**OLS** |Δ%PRICE| $-8 \leq t \leq -2$	**2SLS** |Δ%PRICE| $-10 \leq t \leq -3$
Constant	0.0216	0.0204	0.0221
	(0.0000)	(0.0000)	(0.0000)
$ALVT_t$	0.01383	0.0136	0.0198
	(0.0000)	(0.0000)	(0.0000)
Log(MV)	-0.0007	-0.0006	-0.0007
	(0.0000)	(0.0000)	(0.0000)
$Log(Price_t)$	-0.0014	-0.0013	-0.0014
	(0.0000)	(0.0000)	(0.0000)
|ΔVolatility|	0.3406	0.3832	0.3295
	(0.0000)	(0.0000)	(0.0000)
Years dummy	Yes	Yes	Yes
R squared	0.1712	0.1662	0.1636
Adj. R squared	0.1702	0.1651	0.1626
F-statistic	161.92	136.66	-
Prob(F-statistic)	0.0000	0.0000	-
No. announcements	1540	1540	1540
No. Obs	11773	10298	11773

The table presents the results of the OLS/ 2SLS Pooled regression. The first column reports OLS results when the estimation is made from 10 to 3 days trading before the event. The second column reports OLS results when the estimation is made from 8 to 2 days trading before the event. The last column reports results of the 2SLS estimation made from 10 to 3 days trading before the event. The dependent variable is the absolute value of the percentage difference between the daily price level and its lagged value. ALVT is the daily abnormal log volume turnover estimated with the market volume turnover model, Log(MV) is the logarithm of the firm's market value at t=0, Log(Price) is the logarithm of the daily close firm's share price, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event, Years dummy indicates the presence of dummy variables controlling for year effects from 1995 to 2006. Standard errors are clustered by time and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 3.13: Percentage Price change before the event
OLS Pooled regression

Variable	Δ%PRICE -10 ≤ t ≤ -3	Δ%PRICE -8≤ t ≤ -2
Constant	0.0026 (0.1057)	0.0053 (0.0131)
ALVT	0.0066 (0.0023)	0.0086 (0.0000)
ALVT*DPOSITIVE	0.0046 (0.0804)	0.0016 (0.5455)
Log(MV)	-0.0001 (0.9565)	-0.0002 (0.3079)
$Log(Price_t)$	-0.0001 (0.7054)	-0.0002 (0.3712)
|ΔVolatility|	-0.0311 (0.5681)	-0.0778 (0.4379)
Years dummy	Yes	Yes
R squared	0.01316	0.0138
Adj. R squared	0.01183	0.0123
F-statistic	9.81	9.01
Prob(F-statistic)	0.0000	0.0000
No. announcements	1540	1540
No. Obs	11773	10298

The table presents the OLS Pooled regression of the daily percentage price variation before the scheduled announcement. The first column reports results when the estimation is made from 10 to 3 days trading before the event, while in the second column the estimation is made from 8 to 2 days trading before the event. The dependent variable is the percentage difference between the daily price level and its lagged value. ALVT is the daily abnormal log volume turnover estimated with the market volume turnover model, DPositive is a dummy variable equal to 1 when the cumulative firm's share return on two days after the announcement is positive, 0 otherwise; Log(MV) is the logarithm of the firm's market value at t=0; Log(Price) is the logarithm of the daily close firm's share price, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event, Years dummy indicates the presence of dummy variables controlling for year effects from 1995 to 2006. Standard errors are clustered by time and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 3.14: CALVT-SIZE Regression
Pooled OLS White heteroskedasticity consistence results

Firms' fixed effect regression Model *Variable*	*I*	*II*
CONSTANT	-0.0345 (0.9577)	-0.6906 (0.3374)
Log(MV)	-0.0177 (0.8444)	-0.0625 (0.6693)
Log(PRICE)	-	0.1312 (0.3134)
ΔPRICE	-	6.9475 (0.0000)
|ΔVOLATILITY|	-	7.0636 (0.2225)
R squared	0.1134	0.1582
Adj. R squared	0.0302	0.0763
Prob(F-statistic)	0.0053	0.0000
Number of events	1540	1524
Number of firms	85	85

The table presents coefficient estimates of firm fixed effects regressions of cumulative abnormal volume turnover on the firm size used as proxy for the asymmetric information. The dependent variable is the cumulative abnormal log volume turnover CALVT from 10 to 3 days trading before the earnings announcement and it is the residual of the market volume turnover model estimation. Log(MV) is the logarithm of the firm's market value at t=0; Log(Price) is the logarithm of the average daily close firm's share price from t=-10 to t=-3 days, ΔPrice is the absolute price percentage change from t=-10 to t=-3 days, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event . Standard errors are clustered by periods and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

TABLE 3.15: CALVT-BAS Regression
Pooled OLS White heteroskedasticity consistence results

Firms fixed effect regression Model *Variable*	*I*	*II*
CONSTANT	0.1804 (0.5984)	-0.5939 (0.2626)
Log(BAS)	0.0741 (0.2744)	0.0782 (0.2221)
Log(PRICE)	-	-0.0823 (0.3757)
ΔPRICE	-	6.9415 (0.0000)
|ΔVOLATILITY|	-	11.5438 (0.0636)
R squared	0.1348	0.1801
Adj. R squared	0.0387	0.0857
Prob(F-statistic)	0.0029	0.0000
Number of events	1311	1299
Number of firms	85	85

The table presents coefficient estimates of firm fixed effects regressions of cumulative abnormal volume turnover on the firm size used as proxy for the asymmetric information. The dependent variable is the cumulative abnormal log volume turnover CALVT from 10 to 3 days trading before the earnings announcement and it is the residual of the market volume turnover model estimation. Log(BAS) is the logarithm of the mean bid-ask spread ratio (difference between ask and bid divided by the average sum of bid and ask) from t=-10 to t=-3 days and calculated with the close bid and close ask, Log(Price) is the logarithm of the average of the daily close firm's share price from t=-10 to t=-3 days ΔPrice is the absolute price percentage change from t=-10 to t=-3 days, Δvolatility is the difference between the long-run volatility and pre-event volatility and it is calculated as the difference between the firm's return standard deviations of 200 days and of 10 days before the event . Standard errors are clustered by periods and P-values of the t-test that the coefficient is equal to 0 are in parentheses.

FIGURE 3.1: Cumulative Abnormal Log Volume Turnover

The figure reports the percentage cumulative abnormal log volume turnover from -10 to 10 days around earnings scheduled announcements for firms listed on the SWX between 1995 to 2006. The abnormal log volume turnover is the residual of the volume turnover market model which parameters are estimated in a [-210,-11] days window and log volume turnover is defined as the log of the ratio of the daily number of shares traded on the total number of shares outstanding.